GOVERNING MARINE ENGINES. See p. 41.
REPAIRING GERMAN VANDALISM BY ELECTRIC WELDING. See p. 35.

SHIPBUILDING AND SHIPPING RECORD

A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

LONDON: Queen Anne's Chambers, S.W. 1.
GLASGOW: 87, Union Street.
NEWCASTLE: Lloyds Bank Chambers.

THURSDAY, JANUARY 10, 1918.

Price Sixpence Weekly.
Prepaid Subscription for 12 months:—
Inland, £1 5s. 0d.; Abroad, £1 12s. 0d.

The DELTA METAL Co., Ltd., East Greenwich, London, S.E.10
Sole Manufacturers of:—
DELTA METALS: BRONZE, BRASS, COPPER, NAVAL BRASS, YELLOW METAL, WHITE BRASS, BABBITS, Etc.
Forgings, Castings, Stampings, Rods, Sheets, Wire, Tubes, Etc.
FOREMOST since 1883.

THE YORKSHIRE COPPER WORKS, LTD., LEEDS.
TUBES BRASS and COPPER.
"BEMAL" BRASS CONDENSER TUBES.

WM. McGEOCH & CO. LTD.
FOR
Ships' Brassware, Lamps & Electric Fittings
GLASGOW, BIRMINGHAM, LONDON & NEWCASTLE.

THE "STONE" SYSTEM
OF
HYDRAULICALLY OPERATED WATERTIGHT DOORS.
As fitted to latest Mail and Passenger Steamers.
J. STONE & Co., Ltd., Deptford, London, S.E.8

STEWARTS AND LLOYDS, LTD.
GLASGOW · BIRMINGHAM · LONDON
IRON AND STEEL TUBES
MAIN STEAM PIPES
STEEL CASTINGS
SHIP & BOILER PLATES
TUBULAR DAVITS, DERRICKS, ETC.

JOHN I. THORNYCROFT & Co., Limited.
SHIPBUILDERS & ENGINEERS
MARINE MOTORS & MOTOR BOATS.
ALL TYPES OF STEAM, COMMERCIAL and PLEASURE CRAFT.
CAXTON HOUSE : WESTMINSTER : LONDON, S.W.1

THE SUNDERLAND FORGE & ENGINEERING Co., LTD.,
SUNDERLAND.
ELECTRIC LIGHT & POWER FOR SHIPS. - - ELECTRIC WINCHES.

J. CRICHTON & Co. Ltd.,

Saltney Shipyard, CHESTER

BILLINGTON & NEWTON LTD
TRADE MARK
PHOSPHOR BRONZE, BABBITTS, KINGSTON'S AND MAGNOLIA
MANCHESTER BRONZE
TRADE MARK
TIN AND COPPER NAMO. PLASTIC ANTIFRICTION METALS
LONGPORT STAFFORDSHIRE

Alphabetical Index of Advertisers, Page 44.
1 w.
Classified Index to Advertisements, Page 39

BRIGGS'
BITUMINOUS
ENAMELS & SOLUTIONS
HAVE BEEN APPLIED TO
THE TWO LARGEST FLOATING DOCKS,
THE FOUR LARGEST VESSELS, AND
THE TWO BIGGEST BRIDGES
IN THE WORLD
H.M. MEDWAY DOCK.
SPECIFY AND INSIST ON GETTING
BRIGGS'
THE WORLD'S RECORD
ANTI-CORROSIVES.
W. BRIGGS & SONS, Ld. DUNDEE & LONDON.
United States Agency: BRIGGS'S BITUMINOUS COMPOSITION CO. (Inc.), 17, Battery Place, New York.

SHIPBUILDING AND SHIPPING RECORD
A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

PUBLISHED EVERY THURSDAY AT
QUEEN ANNE'S CHAMBERS, WESTMINSTER, LONDON, S.W. 1.

Branch Offices—
GLASGOW: 87, UNION STREET. NEWCASTLE: LLOYD'S BANK CHAMBERS.
NEW YORK: WOOLWORTH BUILDING.

Telegraphic Address: "RECORDSHIP, VIC., LONDON."
Telephone No.: 2247 VICTORIA.

Subscription, including regular weekly and special issues, published from time to time, payable in advance and postage free:—

British Isles	**£1 5s. 0d.**
Elsewhere	**£1 12s. 0d.**
Single Copies	**Sixpence.**

The Editors will be glad to consider articles and paragraphs submitted by competent writers. All accepted contributions will be paid for. Whilst every care will be taken to return unsuitable articles, photographs and drawings (when a stamped addressed envelope is enclosed for that purpose) the Editors cannot hold themselves responsible for the safekeeping of unsolicited contributions.

VOL. XI.] THURSDAY, JANUARY 10, 1918. [No. 2.

CONTENTS.

EDITORIALS:
The State and Shipping 29
Repairing German Ships 29
Underwriting by Percentage 29
Deferred Repairs 29
The New Atlantic Pool 30
Dutch Shipping 30
German Shipbuilding Cohesion 30
Domineering Engineers 30
Cargo-Handling Gear 30
Australian Shipbuilding 31
American Shipbuilding Programme 31
Prevention of Scale in Boilers 31
Steam Seals 31
Air Pumps and their Combinations 31
The Production of Fuel Oil 32
The Sheer of Ships 32
Mechanical Efficiency of Marine Engines 33
Publications Received 34

ILLUSTRATED:
Repairing German Ships by Electric Welding 35
A 350-b.h.p. Reversible Marine Oil Engine 39
Governing Marine Engines 41

MISCELLANEOUS:
Clyde Shipbuilders and Riveters 34
Norwegian Shipping Receipts 38
Shipping and Foodstuffs 40
Pooling Experience 42
The Order of the British Empire 43

GENERAL NEWS SECTION 48

SHARE TABLE 52

IF there is one industry more than another which stands to suffer under a system of State control, it is shipping. Its efficient management is entirely beyond the reach of the bureaucrat. Yet there are persons who are so blind to realities as to cherish aspirations that after the war the State shall assume the ownership and control of the mercantile marine. In a manifesto of the Labour Party, we notice that amongst the things for which "common ownership" is advocated are "the great lines of steamers." Surely, there has been enough bureaucratic mismanagement of shipping during the war to turn from it with disgust anyone who cares for efficiency. Shipping is a very complex business, and in order to run ships successfully, long familiarity with details, quick grasp of changing trade conditions, alertness in face of competition are necessary. None of these qualities are the normal possession of Government Departments. Bureaucrats are creatures of routine, of slow habit of mind, dilatory and stubborn. The Shipping Controller, in his liner requisition scheme, had to fall back on the organisation of existing concerns in order to work it. These concerns have been built up on individual business management and energy. All this is extinguished under the *régime* of "common ownership" and bureaucratic control. Ocean carrying trade operates in a region of free competition, and in this arena bureaucracy and State Socialism would be absolutely hopeless. Politicians would be well advised not to toy with these impracticable ideas.

The State and Shipping.

Fragmentary accounts have appeared from time to time of wilful damage by Germans to the machinery of their own ships in American waters just before their seizure by the States. The latest issue of the *Journal of the American Society of Naval Engineers* to hand, carries the subject a great deal further by three contributions, freely illustrated, showing how some of the damage was repaired by electric welding. We give, on pages 35 to 38 abstracts from the papers in question. In the course of some remarks one of the authors, Commander E. P. Jessop, U.S.N., refers to the lack of information in readily accessible form concerning the application of electrical welding to cast-iron cylinders, in which practice American railway engineers are said to have had considerable experience. The contributions in our contemporary carry the greater weight in view of the semi-official character of the publication, and we can only deplore that similar broad-mindedness does not characterise Government authorities in this country. Here, unfortunately, the general public is deprived of all knowledge of helpful material, although the fund is rich and almost inexhaustible. After all, it would not give the Germans such a tremendous advantage in the war to let the British public know we are not so barren of resource as is so often pretended.

Repairing German Ships.

It is now two years since a well-known owner of tramp steamers consented to his insurance brokers placing his steamers on a somewhat novel system. In writing their lines, underwriters were asked to express the amount they were willing to accept in the terms of a percentage of the values. Thus, on a top value of £80,000, a line of one per cent. would be equivalent to a line of £800. If the next highest value were £60,000, the same underwriter would have a line of £600, and so on, throughout the fleet. At the time this experiment was tried we commented favourably on it, pointing out the ease with which the clerical work could be done, and the simplification of calculations used in the adjusting of claims and returns which it introduced. We now learn that the same fleet has been renewed for the third time on the same terms, so it is evident that the experiment has proved a success, in this instance at any rate. It is somewhat surprising that the example has not been followed by others. The only objection that can be voiced against it is that there may be some difficulty in limiting the amount placed to exactly one hundred per cent., the figure necessary if the scheme is to work with facility. We presume, however, that the broker commences his risk with confidence in his ability to complete the order. It should not be beyond his powers to limit those underwriters who desire more than a reasonable line to an equitable proportion of the risk, thus enabling all others who are entitled to the offer of the business to participate. On the other hand, a failure to place the amount of an order is no worse if the figure is stated in fractions of the total insurance, or in pounds sterling. In either case the assured must run a portion of the risk himself or pay a higher rate.

Underwriting by Percentage.

American underwriters are now beginning to experience the disabilities involved by owners deferring the repairs on damaged vessels. In this country the problem has been discussed, and up to a certain point settled, by a joint committee of owners, average adjusters, and underwriters, who decided that the repairs should be paid for on the rates current at the time of the casualty, should they be less than those being charged when repairs are effected. The American underwriters will probably attempt a similar solution of their difficulties, but in their case a

Deferred Repairs.

further complication arises through the enormous concessions made to the working classes in the settlement of strikes and labour difficulties generally. Every advance in pay adds considerably to the repair bills, and although we are afflicted with the same problem in this country, there is no doubt that the American wages bills are increasing far more rapidly than ours. In view of the fact that American steamers are being renewed without an increase of premium, it will be interesting to note what steps will be taken to minimise loss from the cause indicated. The payment of claims in excess of a stipulated amount is popular with American insurers, and it is possible that an increase of the amount on which the excess is paid will be suggested as a way out of the difficulty.

The New Atlantic Pool.

That in the reorganisation of the North Atlantic passenger pool there is no provision for the post-war entry of enemy lines may be taken for granted, because for some time before the outbreak of hositilities most of the other interests represented in the old conference were heartily sick of the Prussianism of Ballin, Heineken & Co. A time was approaching when rate warfare would be preferable to peace on German terms, and it would almost certainly have arrived but for the coming of the larger conflict. If the new pool makes its dispositions properly, Hamburg and Bremen should get much more rate warfare than their stomachs can stand. At first sight, the omission in the official communication of any reference to the Dutch and Scandinavian lines which were associated with the old international organisation, no doubt, seems odd. On reflection, however, the reader will probably come to the conclusion that, for the time being, it is better that they should be unattached. Excluded from Cherbourg and Southampton the German lines will be obliged to work all their Central European traffic through North Sea ports, and in doing so they will either co-operate or compete with the Holland-American and the Scandinavian companies. Whether they co-operate or compete will depend on the attitude of these neutral shipping interests which are not in the least degree likely to undervalue association with Entente concerns—whose prospective position relatively to sources of passenger traffic is one of exceptional strength. As we have suggested, our enemies are in for more and better organised shipping warfare than they ever feared to get. And despite their blustering ways their fears were always fairly obvious.

Dutch Shipping.

The general position of the sixteen largest Dutch steamship companies is believed to be represented reasonably accurately for the period 1913-16 by the subjoined summary. The tonnage owned by these 16 concerns represents most of the Dutch merchant fleet and its net total has remained almost stationary since the beginning of the war :—

	1913.	1914.	1915.	1916.
Total fleet of 16 largest owners (gross tons)	972,316	1,071,444	1,087,014	1,089,942
	£	£	£	£
Capital of ditto	8,240,000	8,800,000	9,110,000	9,320,000
Book value of fleet	9,070,000	10,700,000	1[illegible],100,000	9,050,000
Total gross profit	2,700,000	1,738,000	7,150,000	11,780,000
Average dividend	9·97%	7·74%	19·31%	24·62%
Transferred from gross profit to reserve	15%	11%	27%	43%

The value of vessels under construction is estimated at £1,750,000 to £2,250,000 per annum. The decrease in book value of the fleet in 1915 and 1916 is attributed principally to losses by mine and submarine. It is superfluous to comment upon the enormous increase in gross profit. The dividend for 1916 would have been much higher had not millions of gulden been paid in respect of war profits tax for the period August 1, 1914, to December 31, 1916. Foreign capital was represented in these 16 owners to the extent of 34·56 per cent. of the total capital in 1915, and 39·18 per cent. in 1916.

German Shipbuilding Cohesion.

One of the fruits of the war has been the association with shipping and shipbuilding of firms who had formerly no direct maritime interests. The functions, actual and potential, of inland engineering works in the production of "fabricated" ships, have been discussed frequently in our columns. The immediate interest in "fabrication," so far as it concerns the Allies, lies in the possibility of keeping pace with and overtaking war losses. German interest appears to centre chiefly in rapid reconstruction of her mercantile marine after the war, and in securing to South German industrial firms a profitable share in the work of reconstruction. Over and above this, there is the interest of the large industrial concerns in ensuring that tonnage is soon available to handle their oversea requirements and exports. The net result of these several considerations is that a number of "heavy industrial" concerns in Germany have acquired large blocks of shipping shares, whilst others have acquired more or less direct control of shipyards. Krupps have, of course, operated the Germania Werke (Kiel) for many years past. Amongst the war developments may be mentioned the action of the Deutsch Luxemburgische Bergwerksgesellschaft in spending £98,000 on the Nordsee Werke (Emden), and the yet more recent scheme of the Gelsenkirchener Bergwerk A.G. for a large yard at Flensburg with a capital of £830,000. Preliminary work will be commenced at once on the latter scheme, but it is not expected to get seriously to work until after the war.

Domineering Engineers.

A Labour paper suggested recently that other unions of skilled and semi-skilled metal workers were beginning strongly to resent the disposition of the Amalgamated Society of Engineers to dominate the industry. The suggestion is confirmed by other evidence from which the average outsider draws the conclusion that the prospect is far from good. The industry's prospect certainly cannot be bright if the workers are, from any cause, at all unsettled. All the same, the significance of this growing resentment against the engineers is worse for Trade Unionism than it is for the industry. Either the Amalgamated Society of Engineers is drifting away from Trade Unionism or Trade Unionism is drifting away from the Amalgamated Society of Engineers. It withdrew from the negotiation of the Shop Steward Agreement on a point of minor importance in which the other unions, with a much greater combined membership, saw nothing objectionable. And it stayed away from last week's Man Power Conference after the first day's proceedings, although the gathering was otherwise almost completely representative of organised Labour. Nor are these isolated instances of the Amalgamated Society of Engineers' aloofness. Practically, since the outbreak of war it has, wherever possible, acted independently of other unions. Such an attitude is always dangerous. In the near future, however, its dangers will be greatly intensified, because it is inconceivable that the other engineering unions—especially the unions of semi-skilled workers—will see eye to eye with the engineers on the question of the restoration of pre-war conditions. Of course, if there is a conflict the Amalgamated Society of Engineers will lose, but while the battles last the principal damage done will be to Trade Unionism as a whole. The present leaders of the Amalgamated Society of Engineers can hardly be congratulated on their leadership.

Cargo-Handling Gear.

We have for a long time been of the opinion that the question of cargo-handling gear for ocean-going vessels was of much more importance than the average shipbuilder or shipowner was disposed to give it. It consequently affords us considerable pleasure that a man of the business standing, technical knowledge and shipping experience of Mr. C. Waldie Cairns should put his views forward. In the paper entitled "Some Insufficiently Considered Details of Ship Construction and

Equipment," which he read the other night to a meeting of the North-East Coast Institution of Engineers and Shipbuilders, he suggested that the subject was much too big to be dealt with in a paper of general interest. There was room, he thought, for an examination of the whole subject, and plenty of material for a long and important contribution to the proceedings of the institution. That is exactly our point pressed home, and we hope that Mr. Fraser Smith will make a note of it. The importance of the subject seems to us to be in the fact that while the handling of cargo has a great deal to do with the economy of ships, cargo-handling gear and its installation have, in a manner of speaking, been allowed just to grow up. If port facilities for dealing with general cargo were within certain limits standardised, as is the case, we believe, on the American lakes, the first cost and the working expenses of ships would, of course, be lower than they normally are. Unfortunately, they are not. The consequence is, as Mr. Waldie Cairns points out, that ships have to be fitted with heavy and expensive outfits of cargo gear, to spend probably four-fifths of their time as ballast, or as so much idle weight to be carried round at sea. Obviously, there is room for a good deal of discussion on the subject—of points of principle as well as of matters of detail.

Australian Shipbuilding.

Somehow, there does not appear quite so much confidence here in regard to prospective shipbuilding developments in Australia as there is, for instance, with reference to similar enterprise in Canada, where a considerable amount of construction is now being done. And the reason, we fear, is that in the Commonwealth the situation is largely dominated by labour, which, to say the least, is not very reliable. In any case, a beginning has been made with the output of tonnage in Tasmania, and it is now hoped to take up the work in New South Wales if not in the other States. Mr. Cutler, superintendent of the dockyard at Walsh Island, Newcastle, is hopeful that a large number of composite wheat ships, of hardwood and steel, will be built, fitted with internal combustion engines. After the war, he points out, the vessels would be useful in the timber trade with British Columbia. Mr. Joseph Cook, the Minister for the Navy, is taking a keen interest in the proposals, and a statement dealing with the situation has been issued by Mr. Hughes, the Prime Minister. Following a meeting of the Federal Cabinet and a series of conferences with experts, he reports that from enquiries made he is satisfied that the work can be done, although the great difficulty in the past has been labour. During the third year of the war there were no fewer than 508 individual disputes. An understanding has, however, been arrived at, and, if this is carried out honourably, the difficulties will be overcome. There is an ample supply of materials, so that importation will not be necessary. All the same, it is recognised that even under the most favourable conditions the quantity of shipping that can be built in Australia will be but a small part of what is required to transport Australian products, and dependence will continue to be placed on other sources.

American Shipbuilding Programme.

We have frequently urged that the colossal figure of 6,000,000 tons per annum as representing the shipbuilding output of the United States would prove difficult of attainment, and in confirmation of our opinions it is now announced that Mr. Hurley, the chairman of the Shipping Board, promises 5,000,000 tons of shipping in 1918. This is principally based upon contractors' promises, but official circles in Washington have, says the correspondent of the *Times*, high hopes that Mr. Hurley's prediction will be fulfilled. Mr. Hurley's latest move, the bringing of Mr. Ford, of motor-car fame, to Washington to join the staff of the Shipping Board seems reassuring. Mr. Ford will lend his talent for the standardisation of production in speeding up the building of merchant ships, and will introduce the multiple production methods he has used with such marked success in the production of automobiles. Already it has been announced that the Detroit manufacturer considers a great mistake has been made in placing a preponderance of large orders for supplies with the already terribly congested eastern part of the country, where the railways are quite unable to handle the increased factory output. Mr. Ford insists not only that new methods of construction must be employed, but that new reservoirs of labour and material must be tapped. He proposes therefore to establish on the southern coast mammoth shipyards of an entirely new kind, where ships of a standardised pattern can be assembled from parts manufactured in the Middle West and brought down the Mississippi.

Prevention of Scale in Boilers.

The evils which follow the formation of scale upon the furnace plates and tubes of a boiler are too well known to need recapitulation, and it is not surprising that many different methods have been devised for reducing the formation of scale to a minimum. Most of the methods so far devised depend for their efficacy upon the purification of the feed water before it enters the boiler, by filtration to remove matter in suspension, and by precipitation to remove matter in solution, but it has been left to J. Dampney & Co., of Cardiff, to devise a material which applied to the furnace plates and tubes prevents the formation of scale. The compound consists of 98 per cent. pure amorphous carbon combined with a neutral organic vehicle; it is painted over the internal surfaces of the boiler and well rubbed in. When dry it yields a peculiar surface which is antagonistic to the building up of hard scale by crystallisation. Any deposit which may take place can, the makers state, be easily removed without the use of the chipping hammer, and falls off readily over large areas by concussion. The substance is not affected by boiling water or by steam under pressure, and owing to its nature and to the thinness of the film, the transference of heat to the water is practically not interfered with. It is claimed also that the compound will prevent or, if it has already begun, will arrest pitting.

Steam Seals.

The effect of even small leakages of air into any part of the low-pressure system of a condensing plant is to cause a material reduction in the height of the vacuum which can be maintained, and it is therefore of the utmost importance that all sources of leakage, such as piston and valve rod glands, and in the case of turbines shaft bearings, should be rendered absolutely free from leakage. This is of particular importance in the case of turbine installations owing to the greatly increased efficiency which is obtained by the employment of very high vacua, and hence it is usual to employ steam seals at the shaft bearings in the exhaust side of the turbine, consisting of a small annular space situated at about the middle of the bearing into which live steam is led by means of a small pipe and which tends to "leak" very gradually into the atmosphere in one direction and into the turbine casing in the other, thus effectually preventing the entrance of air. This method of preventing air leakage is not only applicable to turbine bearings, but can with great advantage be employed on the low-pressure piston rod and valve spindle glands of reciprocating engines. Captain Dyson, in his paper on "The Development of Machinery in the United States Navy," which was published recently in this journal, has testified to the very beneficial results which followed the adoption of steam seals on the glands mentioned.

Air Pumps and their Combinations.

The results of investigations of the engineering research committee into the working of air pumps in connection with condensing plant—which are of a comprehensive nature—have now been presented to the North-East Coast Institution of Engineers and Shipbuilders. The investigations undertaken by this Committee was for the purpose of determining the relative advantages of the steam jet over those of the reciprocating pump in

extracting of air from a condenser. The report, which is of extreme importance, especially with reference to the production of high vacuum, which is necessary for economical working of turbine machinery, proves beyond doubt that the steam jet is the most effective contrivance for dealing with large volumes of rarefied air with moderately small degrees of compression. In dealing with moderate volumes of air under relatively high degrees of compression, the reciprocating pump has proved very efficient, and it seems reasonable to expect that a combination of the two systems would give the best results in all cases. With multiple steam jets the air may be compressed through the range of compression through which the steam jet works most economically, and the mixture delivered to the reciprocating pump at a pressure at which it can be economically dealt with by the latter. The investigations have proved that with this combination the speed of the reciprocating pump for a given duty can be reduced to about one-third of that when working alone, and the consumption of steam is also reduced *pro rata*. In cargo vessels, with reciprocating pumps driven off the main engines, the advantages of the steam jet may be utilised in reducing the dimensions of condenser and pumps in connection with same, and herein lies the value of the recommendations contained in the report.

THE PRODUCTION OF FUEL OIL.

THE future development of marine engineering is wrapped up to a very large extent in the question of the production of fuel oil. Whether used directly in some form of internal combustion engine, or utilised in the furnace of a boiler as a means of producing steam, oil represents one of the most economical sources of mechanical power yet discovered. Until quite recently the source of fuel oil was the natural wells and gushers found in many parts of the world, notably in Roumania and Mexico, and it is believed by many that oil exists beneath the soil of these islands. The enormous growth in the demand for various kinds of mineral oil, and the uncertainty of the sources of supply already mentioned, has led scientists to search for other sources from which oil can be obtained, and already many interesting discoveries have been made, which only await the favourable opportunity before developing into thoroughly sound commercial propositions.

Reference has already been made in these columns to the problem of producing fuel oil from coal. The Fuel Research Committee have issued a report drawing attention to the vast amount of waste entailed by the combustion of raw coal, and urging the initiation of a vast scheme for the distillation of coal in order to obtain the valuable by-products such as fuel oil, motor spirit, aniline dyes, high explosives, and leaving the residue as fuel for domestic purposes. But it is not essential that good quality coal should be employed for this purpose; cannel coal, which is usually considered as being of so poor a quality that it is either not worked, or else thrown on the dump, has proved to be a valuable source of fuel oil. The Petroleum Research Department, under Sir Boverton Redwood, at the experimental station at Chiswick, have been working day and night for some time past, and as a result of a vast number of tests, not of small quantities, but of 1 or 2 tons of each kind of refuse, it has been found that an average of 35 gallons of crude oil can be obtained per ton. At a meeting of the Scottish Shale Owners' Committee, held so long ago as May 17, it was agreed that supplies of crude oil might be obtained by the treatment of this cannel coal, and it was resolved that arrangements should be made to establish retorting plants at various collieries, and it has been stated that the Petroleum Production Department have had a definite offer from one firm to produce 3,000 tons per week.

An obstacle to the exploitation of the Dorset shales for the distillation of oil is that the sulphur content is high and is obstinately held. Many methods have been tried to obtain such a degree of desulphurisation as will permit the oil to be turned to practical account, and a successful method has recently been devised. In this the disintegrated shale is mixed with a proportion of medium oil and placed in a rotary still, where it is heated to a comparatively low temperature by gas for eight or ten hours, the rotation of the still ensuring that every particle is properly and uniformly heated. The shale oil distilling over with the vapour of the medium oil passes into a second rotating drum containing purifying agents such as copper and lead oxides, which in these conditions are found to be able to reduce the amount of sulphur to about 1½ or 2½ per cent. The vapours are then taken through a catalyser tube, where much of the gas that is ordinarily lost is converted into condensable oil, and the final result is a yield of shale oil amounting, after the medium oil has been deducted, to 16 to 20 per cent. on the weight of shale treated. On fractional distillisation this oil yields motor spirit, kerosene substitute, and boiler fuel oil containing less than the 3 per cent. of sulphur which is the maximum allowed by the Admiralty specification. The spent shale, it is interesting to note, through being constantly tumbled about in the rotating still, comes out in the form of oval briquettes, which can be used for making gas in producer plants.

In addition to cannel coal there exists in many mines an ironstone band which is useless in its present state for iron, but which is found to contain about 25 gallons of oil per ton. It is well known that there exists in this country a vast quantity of ironstone the percentage of iron in which is so low that its utilisation becomes unprofitable. If, however, the oil is extracted from ironstone, there remains a residue containing about 40 per cent. iron, a proportion which renders it sufficiently rich to be of value for the production of pig-iron.

It will be realised, therefore, that many steps are being taken with a view to the production in this country of a reliable quantity of fuel oil. It only remains for the methods of production to be further developed so that the fuel may be produced and sold at a price which renders it commercially advantageous to use it.

THE SHEER OF SHIPS.

SOME years ago a Liverpool newspaper held a plebiscite as to which shipping company possessed the finest-looking steamers. It might have been a coincidence, but the company which received the biggest number of votes had made it a practice for some time past to give their vessels quite a large amount of sheer. Good sheer does undoubtedly add to the appearance of a vessel. It has other advantages also. Passenger vessels, which must be sub-divided according to the requirements of the International Convention, will be able to obtain greater floodable lengths at the ends the greater their sheer, so that, in consequence, they may require less bulkheads, or, what is more likely, they will be able to load to a deeper draught with the same number of bulkheads. Further, their seaworthiness will certainly not be impaired by an increase of sheer. At the present time, large sheers do not find favour because they increase the visibility of a ship, as, more often than not, it is the bow and stern which are first observed from a distance. In addition, sheer, even though small, increases the labour on the top strakes of shell plating towards and at the ends. This point receives special attention in insulated ships, which are sometimes built without sheer in order to simplify the work in fitting the insulation.

For vessels which do not come under the Convention rules, large sheer increases the load draught up to a certain limit. Any increase in mean sheer up to 50 per cent. above the Board of Trade mean entitles the vessel to an additional load draught of one-quarter of the excess. In a 500-ft. vessel, with a mean sheer 50 per cent. above the standard mean, the increase in load draught would be

7½ ins. All things considered, large sheers are likely to prevail in the future.

The actual shape of the sheer line is of great importance with vessels coming under the International Convention rules. The old Board of Trade rules stated that the sheer of the deck-at-side should be 7. 26 and 55 per cent. of the total at the eighth, quarter and three-eighths length from amidships. The Bulkhead Committee, however, have specified that the sheer shall be parabolic in form, which makes the percentages at the same positions as above 6¼, 25 and 56¼. This Committee also states that no point of the sheer line must fall below the parabolic line. If it does so, a penalty is imposed. For instance, if the sheer is put in to the old Board of Trade form, it will be 1¼ per cent. of the total sheer, less than at the three-eighths length, and for this the sheer to be used in the subdivision calculations would have to be 97·7 per cent. of the actual value. In a ship 500 ft. long, with an average total sheer, this might cause a loss of 1 in. in load draught, or about 60 tons of deadweight. It is, therefore, important to see that the sheer line follows the form laid down by the Bulkhead Committee.

What has been said applies particularly to vessels with elliptical sterns. If a cruiser stern is fitted its appearance is generally improved by making the after sheer appreciably less than with an elliptical stern. This reduction in sheer, if appearance is considered, acting in conjunction with the increase of water-line length brought about by the cruiser stern, makes the subdivision of a ship more difficult. The loss in floodable length brought about by fitting a cruiser stern, apart from reduced sheer, in a particular case was referred to in *Shipbuilding and Shipping Record* of March 29, 1917, where it was shown to be 5 per cent. This means a loss in load draught of 5 in., and represents about 300 tons of deadweight.

While on the subject of sheer line and cruiser sterns, it is not out of place to call attention to a precaution that should be taken in setting up the sheer line for a vessel with a cruiser stern. Generally, the lowest point of the deck-at-side will be at the middle of the length between perpendiculars. The Bulkhead Committee, however, used the middle of the waterline length for the lowest point of the deck-at-side. In a ship with an elliptical stern, these points are practically coincident. With a cruiser stern, however, they might easily be about 10 ft. apart, the lowest point for the ship with a cruiser stern being abaft that for the ship with an elliptical stern. In consequence of this, the sheer line as set out for the Bulkhead Committee's rules will, in the fore body, lie above the sheer line set out from the point midway between perpendiculars. The penalty for this would be very large, and in the case of the 500-ft. vessel already referred to, would cause loss of 4 in. in load draught, or about 250 tons deadweight All vessels with cruiser sterns, which come under the Sub-division Rules, should have their lowest point of sheer at the middle of the water-line length.

MECHANICAL EFFICIENCY OF MARINE ENGINES.

OCCASIONALLY shipbuilders and engineers have difficulty in accounting for peculiarities and differences in performances of ships of the same design and displacement. Sister ships may give results radically different, for no evident reason. Some explanations may be given at times to account for such variations in performances, but at other times the probable cause of the difference in results is difficult to find. A case in point came before the writer's notice the other day. Two vessels went on trial of exactly similar dimensions and design, the one fitted with a cast-iron propeller and the other with one of bronze. Now it might be expected, from all previous experience and guidance from experimental data, that the vessel fitted with the bronze propeller would have given the better result. But the performances showed the opposite, the vessel fitted with the cast-iron propeller having a higher constant and speed. From considerations of similarity in design and number of revolutions of screws one was driven to the conclusion that the difference could be due solely to differences in mechanical efficiency of the machinery. The question then arose whether such differences as the results indicated could be attributed to such a cause. The writer's attention was then drawn to a remarkable case. A vessel went on trial immediately after completion, and a certain result was obtained. Some time afterwards reports were heard regarding the good steaming qualities of this ship. The builders were slightly sceptical regarding these, but the owners were willing to place the vessel at the disposal of the builders for the purposes of further trials. Accordingly a second trial was run, with the result that an improvement was observed beyond all the expectations of the builders. For the same actual speed, under the same conditions of draught and displacement as the first trial was run, there was a diminution in power of *thirty-five per cent.* In both trials the vessel's hull was clean and everything which contributed to the propulsive result was the same, except that the year's work had smoothed down the running of the engines and reduced the frictional losses at bearings, &c., by the amount observed on the second trial. This startling result pointed to the possibility of the mechanical efficiency of reciprocating machinery varying very much, according to the practice of the builders of the engines or individual engineers, and the likelihood of this factor being the cause of the difference in results obtained on the trials of ships of similar size and design.

In the course of plotting the results of trials of a large number of vessels built by the same shipbuilder, but engined by different engineers, it was observed that the performances of a certain few were much below that given by the large majority of the vessels in question. It was difficult to assign a reason for this, for the same type of lines were adopted in all the vessels plotted. Some light was given by the shipbuilder on this point. He explained that these giving the bad performances had all been engined by one certain firm, and at once the true cause of their bad performances was made evident, namely, excessive engine friction.

Most engineers, if asked what is the mechanical efficiency of reciprocating machinery, will probably reckon somewhat in the neighbourhood of 90 per cent. In Mr. Denholm Young's paper on the "Co-ordination of Propeller Results," read before the Institution of Naval Architects in 1914, an allowance of 82 per cent. was made for engine friction in the case of cargo-boat engines. Mr. Young personally considered this allowance rather excessive, especially when any good metallic packing is used in the piston-rod glands. In the case of some results examined by the writer an allowance of 24 per cent. for engine friction was necessary before the results of certain sister ship trials were made to harmonise. Such an allowance may seem excessive, but with the evidence before referred to of a difference of 35 per cent. in the same actual ship, a mechanical efficiency of even less than 76 per cent. may be given. It is true that certain experiments with tortionmeters on reciprocating engines have shown that 92 per cent. efficiency is not unknown. On the other hand, the late Sir Wm. White has said that in a large number of cases this efficiency probably does not exceed 80 per cent.

Whilst the mechanical efficiency of engines of the same design may vary with different builders, the evidence to hand suggests that even when built by the same engineers there may be radical differences in inefficiencies. On no other basis can the differences in results obtained by sister ships be satisfactorily explained, unless the weather conditions have varied so much in their respective trials as to make comparison impossible. Whilst it is satisfactory from the trial analysis standpoint to know that a low mechanical efficiency of the engines may be the cause of an indifferent result, some more light is needed on the subject and some reliable figures wanted so that proper estimates can in future be made.

PUBLICATIONS RECEIVED.

[A short notice of any publication does not necessarily preclude the subsequent appearance of a longer review.]

The Works Manager of To-day. By Sidney Webb. London: Longmans, Green & Co., 39, Paternoster Row, E.C.1. 162 pages. 7½ in. × 5 in. × ½ in. Price, 3s. 6d. net.

Brown's Arithmetical Guide for Marine Engineers. By W. T. Thorn, Volume I. Second Class. Glasgow: James Brown & Son, 52 to 58, Darnley Street. VIII + 240 pages. With 62 diagrams and numerous tables. $8\frac{3}{4}$ in. × $5\frac{3}{4}$ in. × $\frac{5}{8}$ in. Price 3s. 6d. net.

This little book has been written for the benefit of candidates for their second-class Board of Trade Engineer's Certificate as a guide to the paper in arithmetic. It is surprising how many young men having served an apprenticeship and spent one or two years at sea find this portion of their examination one of the most difficult to negotiate. With this book to guide them, their difficulties should to a large extent be overcome. It is written in the style which the author so successfully adopts with his students, and pains have been taken to render all such steps as the turning about and solving of equations as clear as possible. Great stress is laid on the necessity for all candidates to thoroughly master the principles underlying each problem and not merely to make a mental effort to remember all the questions in the hope that they will receive 12 of such problems when taking the examination. With this end in view, in addition to giving a series of papers with the solution immediately following each problem, another series of papers is given with merely the answers following, it being hoped that the student will work these without referring back to the similar question—the first series.

The first part of the book is thus devoted to the explanation of the simple rules, a knowledge of which is required by the candidate; the second part consists of questions with the complete working out and answer given, and which the student, having thoroughly understood the first part, should be able to follow for himself; whilst the third part contains a series of questions which the student should be able to solve unaided. Several blank pages are incorporated at the end of the book, upon which other questions and notes can be entered.

We can thoroughly recommend this little volume to the young engineer who is about to sit for his "Second's" ticket and who anticipates any difficulty with his arithmetic. The low price of the book is worthy of being noted.

CLYDE SHIPBUILDERS AND RIVETERS.

A question of considerable importance to shipbuilders was decided by the Munitions Appeal Tribunal in Scotland, at a sitting held in Glasgow on Monday last. The case was one which had been decided in favour of a squad of riveters by the Local Tribunal, and the employers—a firm of Clyde shipbuilders, supported by the Ministry of Munitions—appealed the case. The point raised was whether, under Section 3 of the Munitions Act of 1917, riveters employed on contract were entitled to a week's notice.

When the case was called on Monday, the agent for the shipbuilders said his clients agreed to withdraw the appeal on the points of law raised, but he asked that he should be heard on the question of whether notice was required before the men were dismissed. In the particular case in question, the job should have lasted only two days, but, in fact, it lasted a week.

Lord Hunter, in dismissing the appeal, said he thought that the course that had been adopted in consequence of the turn the case had taken was the right and prudent one. When this case came before him in Edinburgh in the form of an appeal against a decision of the Local Munitions Tribunal in Glasgow, upon the question of the respondents' right to receive a week's notice, the Minister of Munitions intervened. On that intervention his Lordship allowed the Minister to state his position, which was that there was, apparently, a question of considerable moment and of principle raised. He understood that the Minister raised the question of whether men who worked in shipyards as riveters came under the provision of Section 3 of the Munitions Act of 1917 at all. That Act said that if an Order of the Minister of Munitions had been pronounced repealing the provisions of the previous Munition Acts with reference to leaving certificates, it would be no longer necessary that a man should have a leaving certificate before leaving his work. On the other hand, it was provided as coming in place of the provision with reference to leaving certificates that employment should not be terminated on the part either of employers or employed unless upon the footing that a week's notice of the termination was given or otherwise that payment of a week's wages in lieu of notice was made. In the provisions with reference to this matter, certain exceptions were made in the Act. For instance, it was provided that the section would not apply if more than a week's notice was required in a particular contract. Or, again, in the case of workmen who were employed in ship-repairing, the provision of the Act should not apply, or in the case of a workman who was employed on work of a discontinuous or temporary nature.

In the particular case with which he had to deal, the Judge said it did not appear that it could reasonably be contended that riveting work was of a discontinuous or temporary character. No one familiar with the manner in which shipyard work was done in shipyards on the Clyde could hold that as a reasonable view. On the other hand, the Ministry of Munitions had not pronounced any Order to the effect that men who worked as riveters in shipbuilding yards were to be exempted from the provisions of Section 3 of the Munitions Act. Notwithstanding these special provisions, it might very well have been that the work being done was of a character that did not necessarily fall within Section 3. He might take the case of a definite contract to do a specific job, where one man working on behalf of himself and others who were assisting him undertook to do a specific piece of work. In such a case Section 3, Sub-section 1, would not apply, because it was not continuous work. But riveting work was not of that nature at all. In it men worked in squads associated together, at one time doing one piece of work and at another time doing another piece of work. Although they were asked to do one piece of work at one time and another piece of work at another, that did not prevent in any way their work from being continuous. He certainly thought it a startling suggestion that these men were not affected by the Munitions Act at all. Riveting was essentially munition work, and under the provisions of the preceding Acts, if a riveter desired to leave one yard and go to another, he required a clearance certificate. He therefore thought that, in the minor case, riveters certainly came under this sub-section. There might be a particular case where, in view of a sub-contract, a man would not come under the provision of Sub-section 1 of Section 3, but that case had not arisen.

There was one other point involved in the appeal, and that turned on a question of fact, which was a matter for the Local Tribunal to deal with. It was maintained for the appellants that notices had been given. That was denied by the respondents, who said that no definite notice was given to them that their services were to be dispensed with, either on the termination of the particular job on which they were engaged or on any particular date. According to the report of the Chairman of the Local Tribunal, he found that no notice had been given to the men, and on the question of law he found that definite notice required to be given. On the second point, he (Lord Hunter) was not to be held as assenting to the view taken by the Local Tribunal. It appeared to him that in connection with such work as riveting, where, according to the rules of the trade union, men must complete jobs on which they started to work, it would be reasonable and sufficient notice if, at least a week previous to the termination of work on a particular job, definite notice to the men working in each squad were given by the employers that they would not be further employed in their works. It was found that that was not done in this case by the Local Tribunal. On a question of that sort he was not going to review a finding on fact. On the whole question, therefore, the appeal that had been taken in this case fell to be dismissed.

REPAIRING GERMAN SHIPS BY ELECTRIC WELDING.

The November issue of the *Journal of the American Society of Naval Engineers* just to hand is especially noteworthy for some interesting contributions showing how the damaged machinery of German ships seized by America was repaired by acetylene welding. Commander E. P. Jessop, U.S.N., contributes an article entitled "Repairing German Vandalism by Electric Welding"; a short note by the editor of the journal covers some illustrations of the boiler damage to the *Pommern*; and Naval Constructor H. G. Knox deals with the main engine cylinders of the German ships *Neckar, Rhein* and *Bulgaria*.

In the course of his contribution, Commander E. P. Jessop remarks that on April 6, 1917, the interned German and Austrian vessels in the port of New York were taken over by the collector of customs for safe keeping, the crews being sent to Ellis Island and interned. These vessels consisted of the *Vaterland, Kaiser Wilhelm II., Koenig Wilhelm II., President Lincoln, President Grant, Barbarossa, Grosser Kurfurst, Hamburg, Harburg, Pisa, Nassovia, Frederic der Grosse, Prinzess Irene, Adamsturm, George Washington, Martha Washington, Magdeburg, Prinz Joachim, Allemenia, Prinz Eitel Frederick, Pennsylvania, Armenia, Portonia, Maia, Clara Mennig, Dora, Ida, Himalaya, Indra, Matador, Bohemia.* Of these the *Martha Washington* and *Himalaya* were in the courts under distraint and therefore were not available for use.

TYPE OF DAMAGE.

An inspection of the machinery damage was made by a board of naval officers shortly after the damage was discovered and some time before America entered the war. This inspection showed that the vandalism on all vessels was, in general, the same, which would indicate that general instructions had been issued to all commanding officers by the same agent. It also appears that the parts damaged, as a rule, were those probably on hand as spare parts in the home ports of the vessels. In case America did not enter the war, the ships could be again commissioned by utilising spare parts already provided.

As the rapid repair of these vessels was of the greatest importance, a Board of Railway Engineers was appointed to investigate the damage to the machinery of these vessels with a view to the use of electric welding where it could be done satisfactorily. The railway engineers were probably the only ones in that country who had made any extensive successful use of electric welding in connection with cast iron.

The Shipping Board had also appointed a Board of Engineers to inspect these vessels. The inspections by these two boards were made at the same time, although the boards worked separately. The report of the Board of Engineers for the Shipping Board recommended the renewal of all cylinders which were badly damaged. These recommendations were made without any idea of the use of electrical or other methods of welding and were therefore not of any use as to time and cost if welding processes were applied. The report of the electric welders' committee was unanimous in stating that all damaged cylinders could be reclaimed. This report was made after this committee had been cautioned to be very conservative in their statements with regard to what they could do, as it was important that the work be completed in such manner as to render the engines of these vessels as reliable after repair as they had been originally. The electric welders' committee reiterated their report that all the cylinders could be saved.

OPPOSITION TO ELECTRIC WELDING.

Great opposition to the electric welding of cast-iron cylinders developed among certain engineers, and it was with the greatest difficulty that consent was obtained for a trial of this method. With so much at stake, and considering the time element, the logical procedure would have been to repair one cylinder by this method and to put this cylinder through a series of drastic tests. Unfortunately this method was not pursued, and the controversy with regard to the methods to be applied in these repairs continued until the larger vessels were turned over to the Navy Department to be fitted as transports, about the middle of July, 1917.

All told, the principle of electric welding has been applied to 15 ships in the port of New York. Of these 15 ships all are in commission and would probably be ready for service at the end of 1917. In no case known to the writer would the repairs to the propulsive machinery of the vessels delay them beyond the time necessary to equip them as transports. In other words, by the use of electric welding all of the vessels would have been got out as quickly as would have been the case had no damage to the main machinery been done by the Germans, the vessels being in other respect badly run down and in need of extensive overhaul.

At first glance it would appear that the scepticism of marine engineers toward the electric welding of iron castings would indicate a lack of progressive ideas in the marine world, when it is a fact that the railways have been using this method successfully for several years. This, however, is not necessarily the case, inasmuch as marine repairs do not bring into play the repair of cast iron as frequently as do railroad repairs. Cracking of cylinders is one of the most common of locomotive breakdowns. This, added to the imperative need of some method of quick repair for railway equipment, has served to develop in this particular branch of engineering the use of electric welding far beyond its development in the marine world.

The damage done to the machinery of each vessel was photographed and drawings of the various breaks in the castings were carefully made.

THE "ARMENIA."

The first vessel upon which this method of repair was tried was the *Armenia*, which had been taken to a private shipyard for overhaul. The cylinders were removed from the ship to the dock, although this was unnecessary. The welders were put to work welding two nozzles on the main cylinders. None of the engineers of the shipyard believed in the process, and for that reason the welders worked under a handicap. This particular piece of work is interesting because when finished no caulking was necessary on these welds. When the first test was made some leakage developed in the weld and it was found that, due to the position of the cylinder, the welders had difficulty in reaching the points to be welded, and the work was not properly done. When the cylinders were turned over, so that the operator could get at the work easily, the weld was very soon completed and a test of 75 per cent. above the working pressure showed no signs of leakage of any description. The vessel was very quickly placed in service at a cost for this particular part of the work of about one-fourth of what had been anticipated.

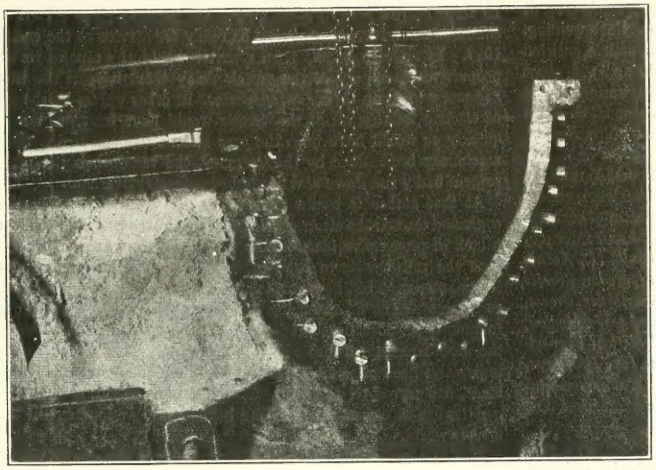
THE "NASSOVIA."

The next vessel, the *Nassovia*, had almost a similar job, that is, two steam nozzles to be welded. On this work an air caulking tool was used to caulk the whole surface of the weld. From that time on no weld was considered satisfactory until it had been thoroughly gone over by the caulking tool. It was found that on laying on the welding metal it might be porous in spots, but in addition to the necessity of closing up the porous spots, the hammering of these welds is sure to develop any hard or brittle metal, and where any such does develop, that part of the weld is immediately cut out and new welding metal laid on. The writer believes it *essential for safety* that no weld, whether done by the electric process or by oxy-acetylene, be considered safe for such work until it has been hammered and the weld proved in that manner.

THE "PISA."

The *Pisa* was next welded, this being another case of welding main engine nozzles. One of the effects of the scepticism of engineers with regard to this work was shown when the *Pisa* sailed from New York to Norfolk and, on arrival at Norfolk, it was reported

that the weld had given way. Investigation demonstrated that two small pin-holes had shown up in the weld from which oozed an occasional drop of water, no steam issuing whatever, but there had been so much talk of the dangers of the electric welding that the engineers of the vessel were afraid to go to sea with it. It was only after the naval engineers from the Norfolk Navy Yard had pronounced the work safe that the engineers of the ship were prevailed upon to make the voyage.



"Prinzess Irene." Damaged H.P. Cylinder. Ready for Insert preparatory to Welding.

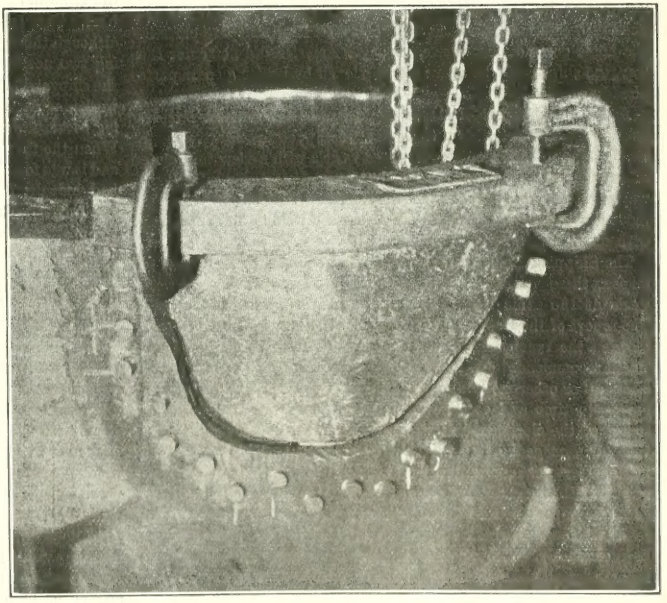
THE "PRINZESS IRENE" AND "FREDERIC DER GROSSE."

The *Prinzess Irene* and the *Frederic der Grosse* were sent to the Navy Yard, Brooklyn, N.Y., for overhauling. The breaks shown on these engines were probably as difficult of repair as any. From the start no trouble has ever developed with regard to the welds after they were pronounced finished. The photograph above shows the break after being prepared for welding; the second shows the cylinder with the insert fitted ready for welding, and others show the completed weld. It will be noted that the cast-iron side is studded. This is not done as a necessary part of this repair, as all tests of welds made by the welding apparatus have shown practically the same tensile strength as the material which was welded. This laying over of metal on the cast-iron side of the weld was merely done as a precaution and to increase the strength of the weld beyond that of the rest of the cylinder. Studding up the cast-iron side of the break has also been the subject of much criticism, numerous engineers having jumped to the conclusion that the repair was not made by welding the cast iron nearly so much as it was made by welding around steel studs which had been embedded in the cast iron. This, however, is not a criticism which is vital, because it was only necessary that the cylinder welded be rendered as strong as before the break, and this undoubtedly has been accomplished in every case.

The welding done on the *Frederic der Grosse* and the *Prinzess Irene* was the first straight electric welding in any of these vessels. In all previous cases the scepticism of the engineers who had immediate control of deciding upon the form of patches which should be used caused them to have patches cast overlapping the cylinder walls and there bolted to the walls, so that part of the pressure was taken by the bolts and not all of it by the weld, as is the case of the *Frederic der Grosse* and the *Prinzess Irene*.

THE "KOENIG WILHELM II."

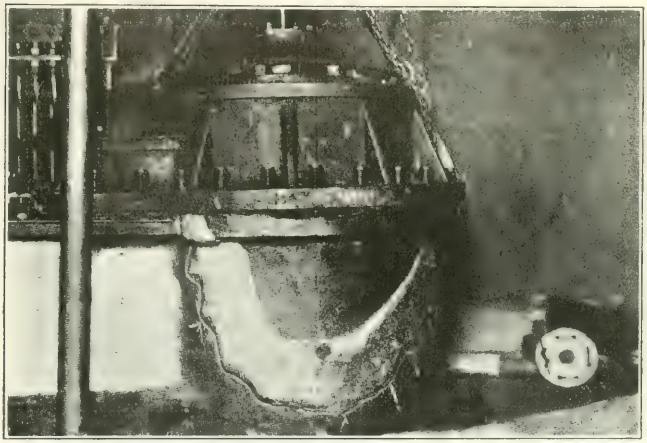
On the *Koenig Wilhelm II.* the original intention was to repair the cylinders by mechanical patches. These patches were made of composition and in most cases were in the form of inserts between cast-iron sides of the breaks. When these vessels were taken over by the Navy Department all composition patches were discarded and cast-steel patches substituted, but, due to the fact that the cylinders had already been tapped for the bolts of these mechanical patches, the cast-steel patches were bolted to the cylinders and then welded. The amount of fitting necessary to make a mechanical patch steam-tight is shown by the fact that ten weeks after the *Koenig Wilhelm II.* repairs had started the machinists were still at work on these patches scraping them to a fit The difference between this method and that of welding steel patches is shown by the fact that many of the patches on the *Frederic der Grosse* and the *Prinzess Irene* were fitted in 48 hours ready for welding. In other words, they were not fitted at all, but merely bevelled off to receive the welding material.



"Prinzess Irene." Damaged H.P. Cylinder. Insert in Place ready to Weld.

THE "KAISER WILHELM II."

On the *Kaiser Wilhelm II.* a slightly different condition was encountered in that the liners for the cylinders in some cases had pieces broken out of them. In the case of the low-pressure liners it was decided that the small area covered by the break did not justify the condemning of these liners. Therefore, cast-iron inserts were made and welded in place and then ground down to the surface of the rest of the liner. New liners were cast for the high-pressure cylinders.



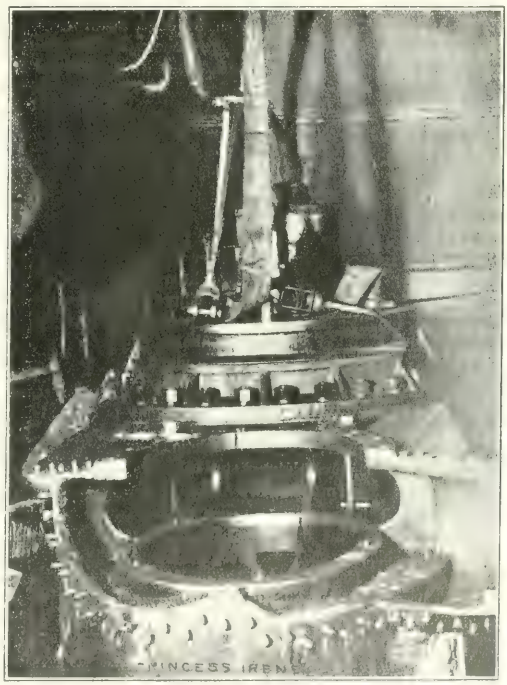
"Prinzess Irene." Damaged H.P. Cylinder. Finished Weld.

Besides the damage to the cylinders and valve chests there were some cases of bent piston rods, broken pistons, broken cylinder covers, and various other smaller items of destruction. On the *Kaiser Wilhelm II.* the intermediate piston rod on each engine was badly bent, but not so badly as to preclude its being straightened and replaced. This work is now completed. In no cases were the boilers of these vessels maliciously injured, and in very few cases were the major auxiliaries tampered with. From the methods used in disabling the machinery it would appear that the Germans had a definite plan in view, and it is very probable that all parts broken have duplicates already cast and ready in Germany to replace them at the end of the war. In a number of the ships the engines were disabled by breaking or throwing overboard the throttle valve. The procuring of new throttle valves has generally taken as much time as the repairs to the breaks of the machinery.

THE "VATERLAND."

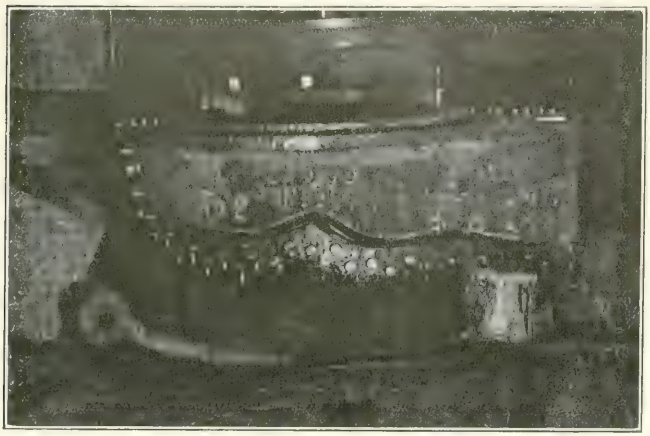
The case of the *Vaterland* is quite different from that of any other of the ships. The *Vaterland*, being the largest ship afloat and the most complicated, seems to have had inferior engineering talent operating it. Her engines are of the Parsons type of turbine, there being four ahead and four astern turbines on four shafts. All the ahead engines were found in excellent condition and all of the astern engines were found more or less damaged. The major part of this damage seems to have been due to faulty operation and not to any malicious intent. Cracks were found in the casing of the starboard H.P. astern turbine. These were so extensive that it was palpable that the engines had not been used on the last run. This view has been corroborated since by the discovery of certain written matter on board showing that the vessel made the last trip on three propellers and at reduced speed. One crack in the lower casing of this turbine extended a distance of about 8 ft. around the circumference of the steam belt. Other cracks were found in the upper half of the casing. In addition to this the dummy cylinder was found cracked in three places, all being in the wake of the nozzle box. This turbine has one stage of impulse blading, and as the action of the nozzle boxes had evidently been such as to distort the casing and develop the cracks which were found, it was decided to cut off the impulse blading entirely. While this will reduce the economy in these engines, it is not believed that it will reduce the power to go astern to any extent, since more steam will be admitted to the reaction blades than formerly.

The auxiliaries of the *Vaterland* were in fair condition, as were the boilers. The vessel has 46 Yarrow boilers with closed ash-pit system of forced draught. The boilers showed evidence of poor handling. The presence of a great amount of oil shows poor marine practice, and it appears that the Germans were using lubricant in the cylinders of the auxiliaries. This practice has been discontinued in the American Navy for many years. It is a curious fact that, although this vessel had steam lines which in some cases extend over a length of 300 ft., she was not fitted with proper drains and traps, such drains as were fitted being run into the bilges. The boilers were not fitted with internal feed pipes, and as a result they seem to prime very easily. Internal feed pipes have been fitted. Beside the damage to blading of the astern turbines,



"Prinzess Irene." Damaged I.P. Valve Chest, ready for Insert, preparatory to Welding.

a few minor attempts at disabling the ship were discovered. One section of suction pipe to the fire and bilge pumps was found with holes bored in it, these holes being plugged up with putty and red lead and then covered so that they would not be discovered. The glands for the stern-tube stuffing box had been removed and strewn through the bilges. A great deal of water had entered the stern-tube compartment. All parts of these glands were found and replaced and the compartments cleared of water.



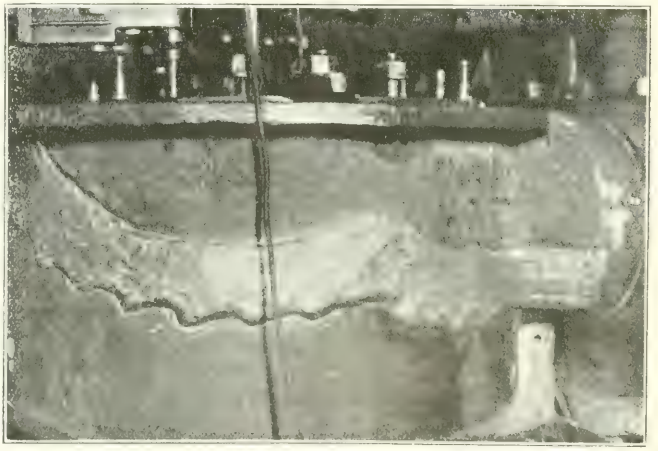
"Prinzess Irene." Damaged I.P. Cylinder. Insert in Place, ready to Weld.

Commander Jessop concludes his communication by drawing attention to the following items with regard to electric welding and its proper application. In welding cast iron it is particularly essential that the welding metal be laid on the cast-iron surface with the greatest care, since it is the juncture between the cast iron and the welding metal which is liable to be inferior. To accomplish this the welding metal should be laid over the cast-iron surface wherever possible before the patches are put in place. This method gives the welder more room to work and permits him to keep a steadier arc and thus reduce the probability of too much or too little heat spoiling that part of the weld. This metal as it is laid on the cast-iron surface must then be peened by a caulking tool in order to develop any hard spots or spots where contact is not good. After this part of the operation is completed the patches should be put in place, and the completion of the weld then is merely welding of steel to steel, which is a very simple process.

Of course, it is important in such special work as this that the operators be the most skilful obtainable. In the work which has been carried on in the German ships the operators have not been particularly skilled men in all cases on account of the great number necessary and the comparatively few who are fairly skilled in this art. For that reason more cutting out and replacing of bad metal has been necessary than would have been the case if the work had not been so extensive and had only skilled operators been used.

It is thought to be a remarkable fact that in all the work which has been undertaken by the electric welders there has never been a failure, this in face of the fact that almost every conceivable kind of patch has been handled, and also in face of the fact that the work has been very much more extensive than any ever before attempted. The author believes this is practically the first of its kind of any moment to be attempted in marine engineering, and his belief is that the scraping of cast-iron parts of machinery is entirely unnecessary and will very soon be a thing of the past. It cannot be too strongly insisted that in every case in which this method has been used the repaired job has been fully as strong as it was before the damage was committed, and in most cases stronger in the part affected.

(To be continued.)



"Prinzess Irene." Damaged I.P. Cylinder. Finished Weld.

Norwegian Shipping Receipts.

The Norwegian official returns, the figures in which are too low rather than too high, show the receipts of Norwegian owners to have been about £58,500,000 in 1916, *i.e.*, about twice as high as in 1915 and five times as much as in 1914. The receipts for 1913, the best year before the war, were not much more than one-fifth of those for 1916. By far the greater part of the 1916 receipts was derived from foreign sources and thus represents an addition to national assets. In no other country has this increase been so great, per head of population, and in it is to be found both the reason and the means for the remarkable speculation in Norwegian shipping shares.

The distribution of receipts from various sources is shown by the following analysis :—

Year.	Steamships. Free service.	Steamships. Time charter.	Sailing vessels. Free service.	Total.
	£	£	£	£
1916	36,750,000	16,800,000	5,090,000	58,440,000
1915	17,700,000	6,320,000	2,150,000	26,170,000
1914	5,990,000	4,130,000	1,555,000	11,675,000

The receipts from time charter have increased in considerably lower proportion than those from free service. The great increase in sailing vessel receipts, compared with 1915, is interesting. The fleet which yielded the 1916 receipts was considerably smaller than in 1914, viz., 1,330,000 tons of steam and 425,000 tons of sailing tonnage, compared with 1,440,000 tons of steam shipping and 523,000 tons of sailing vessels in 1914.

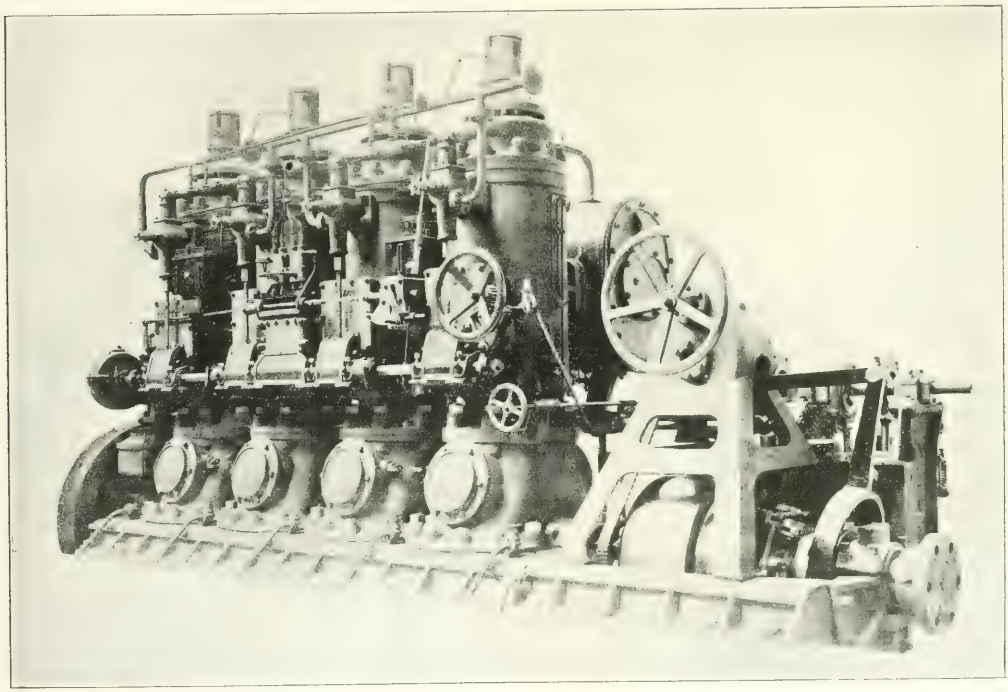
A 350 B.H.P. REVERSIBLE MARINE OIL ENGINE.

DESCRIPTION OF 4 M 6 TYPE KROMHOUT MARINE ENGINE.

The growing popularity of the oil engine as a means for driving small coastal and river craft is one of the most noticeable of the many developments which are taking place on every side, all tending towards a greater industrial efficiency. The engine which is described and illustrated below is of such size and power as to render it applicable to many different types of small craft, and in view of its compactness and simplicity of control, the space occupied and the attention required by it are both reduced to a minimum.

The engine operates on the two-cycle system, having four cylinders of $16\frac{3}{4}$-in. bore by $18\frac{3}{4}$-in. stroke, and develops its full power at about 240 r.p.m.

The starting and reversing of the engine is effected by means of compressed air.



Kromhout Reversible Marine Oil Engine, 325-350 b.h.p.

The cam shaft is carried on the front of the engine, two cams being fitted in way of each cylinder for operating the air starting (and consequently reversing) valves, according to the direction in which the engine is required to run. In addition, the cam shaft has four cams for operating the four fuel feed pumps, which are mounted on the front of the engine, between the No. 2 and No. 3 cylinders, at a height particularly convenient for observation and overhaul.

This cam shaft is operated by the hand wheel, by means of which the shaft can be moved in a fore and aft direction either with the engine stationary or with it running, the cams being so arranged that the movement of the cam shaft with the engine stationary is bound to admit compressed air for starting purposes to the cylinder in the best position for commencing the rotation of the engine in the required direction, either to go ahead or astern, and the engine has therefore no dead centre, but will start in any position ahead or astern simply by the operation of the hand wheel in the required direction.

Air is admitted to the requisite cylinder through the air valves the jackets of which are water cooled, and immediately above these valves a small horizontal cone valve is fitted for indicating purposes.

The hand wheel mounted on No. 4 cylinder operates all four compression relief valves.

The hand wheel shown between the third and fourth cylinders is for the purpose of regulating the stroke of the fuel feed pumps and consequently the revolutions of the engine, the shaft operated by the lever being also connected to the governor, so that the stroke of the fuel feed pumps is adjusted as requisite by the governor in the event of the load being suddenly taken off for any reason.

A hand wheel operates the friction clutch used for disconnecting he propeller shaft from the engine when the signal "stop" is telegraphed down from the navigating bridge; the governor then automatically comes into action and reduces the stroke of the fuel feed pumps as necessary, so that the engine runs dead slow at about 100 r.p.m., at which speed the cylinder vaporisers remain at a proper temperature to keep the engine running an indefinite time, the quantity of scavenging air being automatically adjusted by the governor immediately the hand wheel is moved to the neutral or stop position.

If with the engine turning "ahead" the telegraph should ring down "astern" there is no need for the clutch to be operated, and the hand wheel is not touched, the engineer simply employing the hand wheel operating the cam shafts. The engine comes to a rest and then commences to rotate in the opposite direction; this applies at full speed as well as reduced speeds.

The governor is a piece of mechanism with several functions. It is, of course, primarily designed to control the revolutions per

minute of the engine. It does so in two ways. When the load is taken off it reduces the pump stroke and so the revolutions to the minimum of 100, mentioned above, and at the same time throttles the scavenging air in order to maintain the required temperature in the combustion chamber. It further has one particular advantage, and that is when the engine at sea is running at the normal full revolutions of 240 per min., if the propeller in a heavy sea heaves out of the water, so taking the load off the engine, the governor instantly prevents the revolutions from either increasing above 240 and so overcomes any tendency to racing in a sea way. At the same time, in a sea way the revolutions are maintained at full speed by means of a lever, which results in the speed of the vessel in a sea way being kept up as the propeller is always running at 240 revolutions, both when out of the water and when it plunges back into the sea.

At the after end of the engine and behind the control wheel are placed the bilge and circulating pumps, each being a duplicate operated by a shaft driven off the crank shaft by a silent chain, the pump shaft running at 150 revolutions when the main engine is turning at 240.

The thrust block is of the ordinary marine type.

Lubrication is effected by means of two pump feed lubricators mounted between the first and second and third and fourth cylinders at a height convenient for the engineer to see the quantity of oil in the reservoirs. The lubricators are operated by the cam shaft and are provided with sight feeds and supply oil to the cylinders and all bearings, except the thrust block bearings which are provided with separate wick feed lubricators. The lubricators are of a special type and possess the distinct feature of having no valves at all in the delivery pipes.

The big end bearings and main bearings are all lined with white metal, and all main bearings can be removed and replaced or interchanged without dismantling the engine.

The engine possesses several small features which assist to efficiency in service at sea, such as a control wheel, which enables the quantity of scavenging air to be adjusted by the engineer to his liking in relation to the revolutions per minute, and at the back of the engine a hand control valve is fitted to each circulating water supply pipe, so that the quantity of circulating water per cylinder can be adjusted as requisite, provision being made by means of safety valves on the circulating water pumps to prevent any damage happening to the pumps, should, through inexperience, all four control valves be closed down at the same time.

The scavenging air is drawn into the crank case through specially designed valves, which are silent in their action, and are provided with gauze guards to prevent any foreign matter being drawn into the crank case. The compressed air on the down stroke of the piston passes up through the piston to the cylinder, and in this way a draught of cold air passes the gudgeon pin and so cools it.

Another detail which adds to the convenient use of the engine at sea is the receptacle for methylated spirit required for the preliminary heating of the lamps. A deep cup with a long handle is provided, which can be conveniently filled without danger of spilling, and put into position and lit up without any chance of the spirit spilling over if the ship is rolling heavily.

But the feature of the engine is the vaporising arrangements, which it is not proposed to describe in detail, but the result of which is that the blow lamps are required for starting purposes only, and once the engine is running it would continue to do so at any revolutions between 100 and 240 for any length of time without the blow lamps having to be re-lit and without any danger of the engine failing to pick up the full load immediately, even if the engine were running at its lowest number of revolutions for several hours, and this result is obtained without any outside mechanism beyond the fact that the quantity of scavenging air is always proportionate to the revolutions per minute.

In conclusion, it is hardly necessary to say that the engine requires no water injection under any circumstances whatsoever.

Included in the outfit of this type of engine is an auxiliary set, the horse-power of which varies according to the requirements of the owners, that is to say, the work that the auxiliary engine is required to do. The auxiliary engine is supplied primarily to drive the air compressor for the compressed air required for starting and manœuvring the main engines, but owners sometimes require the auxiliary engine to also drive a dynamo and supplement the bilge and ballast pumps.

With a 4 M 6 type engine an 8 h.p. would be sufficient for driving the air compressor only, but as in the type of vessel to which engines of this horse-power are supplied electric light is almost always fitted, the normal horse-power of the auxiliary engine is 12, so that it drives the dynamo, also an auxiliary set of bilge and ballast pumps, and, in vessels working in hot climates, ventilating fans, &c.

The auxiliary engine is generally constructed on the same principle as the main engine, but of course is not provided with reversing gear. It uses the same oil, and in common with other types of Kromhout engines, when started runs continuously without the starting blow lamps having to be re-lit under any conditions of load.

SHIPPING AND FOODSTUFFS.

The Ministry of Food has submitted to a conference of shipowners a scheme by which, through their co-operation, additional supplies of food may be brought into the country.

The Director of Ships' Stores (Mr. T. G. Jones) presided over the conference, at which sixty of the leading London firms were represented. The scheme was unanimously accepted. Every ship, large and small, coming into British ports will use such spare store room, or other accommodation available—even passenger state rooms, when unoccupied—for the conveyance of foodstuffs. All surplus stores brought in this way will be pooled. The pool will be controlled on co-operative lines by a committee of shipowners at the large ports, and these pooled supplies will be put in or taken out at actual cost price, including insurance. Home supplies will be drawn from as little as possible.

The saving of foodstuffs is obvious. Each individual company will enjoy a freedom of bringing in foodstuffs. For instance, a line trading to and from India will bring in tea, rice, split peas and other foods. A River Plate steamer will naturally bring in frozen meat and butter. An Australasian or Colonial steamer will bring meat, butter, flour or other articles.

It was suggested that committees of shipowners should be formed at the principal ports, and Lord Rhondda will render all possible assistance to enable them to take over the surplus stores brought in by this method. The Ministry of Food is prepared, it is understood, to place at the disposal of these Home Committees, the assistance of any Government purchasing agencies they may have abroad. It is not intended to interfere with legitimate trading, and the committees will arrange for the foodstuffs to be delivered to their respective ships through the usual trade channels.

The scheme really means that every cubic inch of additional space will be used for bringing in foodstuffs. Instead of drawing upon home stocks, ships will be supplied with essential foodstuffs, so far as may be, from the "pool" thus made.

A London committee has been appointed to draw up working details of the scheme, under the chairmanship of Mr. Frank H. Houlder, of Houlder Brothers, and Mr W. G. de Gruchy, of the Commonwealth and Dominion Line, was appointed hon. secretary.

Lord Rhondda proposes to place this scheme before the Shipowners' Associations at the large ports. He will endeavour to coordinate all the committees in a general working arrangement, so that ships may take their supplies at the respective ports they are sailing from and thus save transport, carriage and labour.

Lord Rhondda sincerely hopes the arrangement will be universally adopted in the national interests.

GOVERNING MARINE ENGINES.

The effective governing of the marine reciprocating steam engine is a problem of considerable difficulty, owing to the sudden and violent fluctuations of load to which these engines are subjected to in a heavy sea when the vessel is pitching. The emersion of the propeller blades is accompanied by a large increase in the number of revolutions of the engines, which results in heavy shocks being transmitted to the machinery and hull of the vessel. To eliminate this trouble, various types of governing apparatus have from time to time been devised, but none of these have entirely overcome the trouble owing to the comparative slowness of their action to prevent racing. A governor may respond quickly in shutting off steam when the engines have reached a prescribed speed above the normal, and yet be unable to prevent racing owing to the fact that a considerable quantity of steam is bottled up in the engine steam chest and cylinders. The steam contained before escaping to the condenser does work in the various cylinders against the reduced external resistance, and is sufficient to produce considerable acceleration of the engine's speed. To cure this further trouble, various anticipatory governors have been devised working either by air pressure or other

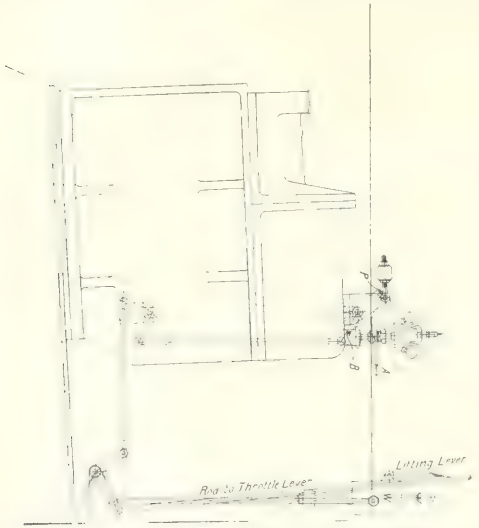


Fig. 1.—Loaded Centrifugal Governor, with Trip Gear for Large Turbines.

electrical means, by which any change in pressure at the stern of the vessel will affect the steam supply to the engines before they begin to race, but these again have all more or less proved imperfect. Experience has shown that the only safe remedy is to stand by the throttle lever and work by hand as the ship begins to rise by the stern.

In turbine-propelled vessels—especially of the direct-connected type—no trouble is experienced with racing under heavy weather conditions, owing to the fact that the smaller diameter and more deeply immersed propellers do not become uncovered by the pitching of the vessel. For the purpose of obtaining the maximum of economy under all conditions of loads in land turbine practice, various governing devices of both electrical and mechanical means have been used. The device invented by the Hon. Sir Charles Parsons for the reaction turbine, in which governing is obtained by giving periodic blasts of steam through the turbine is well known; the periodicity of the blasts is automatically adjusted to suit the particular load or fluctuation of load. In the case of impulse turbines fluctuations of load are provided for by varying automatically the number of nozzles open to steam in the steam chest. By these means the full admission pressure is maintained at the turbine under all loads, and thus avoids the losses which are incurred in wire-drawing of the admission steam. In marine practice these refinements in governing are, however, not required, group controlling of the nozzles by hand in the steam chest of impulse turbines will provide for all necessary variations in power met with in service.

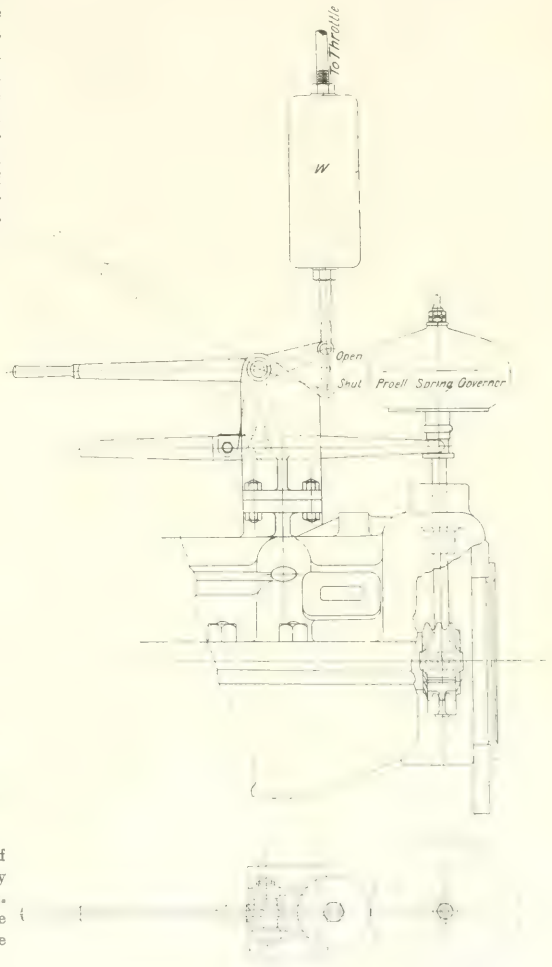


Fig. 2.—Loaded Trip Governor for Small Turbines.

It is advisable, however, to fit in all cases a governor of an emergency type, in order to provide for the possibility of losing a propeller or breakage of a propeller shaft. This governor must be of a type which will respond quickly in shutting off steam at a prescribed speed of revolution, which may vary from 10 per cent. to 20 per cent. above the normal working speed. As in the case of reciprocating engines,

when steam is shut off a certain amount will be enclosed in the turbine cylinders, which will produce a further rise in revolutions before the steam reaches the condenser; this is, however, generally small, owing to the quantity of steam contained being relatively small compared with the nominal flow, and also due to the short period of time taken by the steam to reach the condenser. The time taken by the enclosed steam to pass to condenser depends almost entirely on the ratio between that quantity and the normal flow under full-power conditions, and also on the initial working pressure. The acceleration produced will also depend on the relative dimensions and mass of the rotating parts. If m represents the weight of steam enclosed in the turbine in lbs. at cut-off, and M lbs. per second be the flow of steam through the turbines under full-power conditions, then the time required for the turbine to free itself of the enclosed steam can be represented by the approximate formula :—

$$t = \frac{m}{M} \log. \frac{p_1}{p_2}$$

where t is the time in seconds, p_1 the initial working pressure in lbs. per square inch absolute, and p_2 the initial pressure when steam is incapable of causing further acceleration of the parts, which may be taken from 5 to 10 lbs. above condenser pressure. If W be the weight of rotating parts, and K their radius of gyration, and if T be the mean torque exerted by the enclosed steam during its passage to the condenser, then the ratio between the maximum revolutions obtainable after steam is shut off and that corresponding to the cut-out revolutions can be represented by the formula :—

$$R = 1 - \frac{310}{WK^2} \frac{T}{N} t$$

where R is the revolution ratio and N the cut-out revolutions.

In turbine vessels of the direct-connected type, governors of the loaded centrifugal type driven by means of worm-gearing off the forward end of turbine spindle have proved very satisfactory. These are fitted with some form of loaded trip gear, which enables the steam to be instantly shut off when the revolutions exceed the desired limit. In Fig. 1 is shown an arrangement which is sometimes used in large vessels. The lever A engaging with the governor sleeve on rising by a certain amount releases the pawl P on end of second lever B, the latter being connected through a system of bell-crank levers and rods to a butterfly valve in the main steam pipe. The weight W which operates the throttle valve is made sufficiently heavy to close the valve rapidly, but without shock. Fig. 2 is an arrangement also used in smaller vessels, the weight W for closing throttle being carried by a second lever adjacent to that engaging with the governor sleeve.

In the Cunard liner *Mauretania* a governor of the Aspinall type is used, which is driven off the forward end of each turbine spindle through a worm and worm-wheel, the latter being keyed to a shaft at right angles to the main turbine shaft. The lever carrying the governor is driven by means of a crank and connecting-rod taken by this second shaft, and runs at half the speed of turbine spindle. Steam is shut off at the desired limiting speed by means of the governor pawls coming in contact with a trip lever, which actuates the main shut-off valves through a "Brown" engine.

The trip lever of each set is slotted at the end, so that in the event of any one turbine exceeding the prescribed limiting speed, it may be instantly shut off without interfering with any of the other turbines.

With geared turbine ships having large gear wheels, sufficient experience has now been obtained to show that no serious racing of the engines will take place under heavy weather conditions, but in these cases it is also necessary to provide some type of emergency gear for shutting off steam in case of accidents to propeller or main shafting. A loaded governor of the centrifugal type is also found suitable for this purpose, but it is very important in this case for the governor to be adjusted in such a manner as to ensure that the turbines will not greatly exceed the limiting speed desired. In these turbines the stresses on the various rotating parts are mainly due to the action of centrifugal forces, and as these grow in the proportion of the square of the speed, it is seen that careful attention must be given to keep these stresses within the safe limits of the materials used. With the high revolutions of these turbines, effective use can be made of some form of shaft governor which will occupy very little space and weight. These types are now being largely used in high-speed turbines.

A simple form of shaft governor has been tried which has given every satisfaction, and is of the following nature :—An eccentrically bored annular ring somewhat greater in the bore than the diameter of turbine spindle is slipped over the shaft, and is kept in position by a pin attachment through the shaft together with the action of a compressed spring enclosing the central pin. When the turbine reaches the limiting speed the centrifugal force of this ring overcomes the spring load, and it moves away from its position and engages with a trip lever operating the governor throttle. In order to obtain rapid response, it is essential for the spring to be so designed that the increase in its resistance, as it is being further compressed, will grow at a less rapid rate than the increase in the centrifugal force of the ring as it moves farther from the centre of rotation. By proper proportioning of the weight of ring and initial compression of spring, this governor can be made to give practically instantaneous control of the turbines in an emergency.

POOLING EXPERIENCE.

It is said that two heads are better than one and while, as with most popular sayings, there are exceptions, there can be no doubt that this is very true where the building of ships is concerned. When a new vessel is to be built the shipowner will prepare an outline design, or will send the principal features of the ship to the builder, who will go into the matter in consultation with the owner's representatives. There can be no doubt that in this way very efficient ships are evolved. The representatives of the shipowner acquire a vast amount of experience appertaining to the special qualities required in the ships of their line, and they take particular care to see that these features are embodied. On the other hand the shipbuilder, while not possessing the same particular experience, has a very wide general experience of all kinds of vessels, and of similar vessels running in the service of other shipowners. He is, therefore, in a position to make many suggestions which would probably not occur to the owner's representatives, any more than those which the latter make, would occur to the former. This is particularly true where new types of vessels are being considered, and where more up-to-date machinery is to be fitted than has been used by the company in the past. In such a case it may be said in a general way, that the owner's representatives have little knowledge of the possibilities and limitations of the new appliances, but they still have their special requirements and the builder must see to it that these will be fulfilled.

From what has been said it is assumed that the shipowner has technical representatives. While this is generally the case with regard to the machinery, unfortunately, it is not so with regard to the ship herself. It follows, therefore, that such owners must suffer in consequence. Shipbuilding is now a science, although the scientific side of it has not yet been fully developed. The more it is developed the greater will be the progress in shipbuilding, and it behoves all owners in view of this to see that they have responsible technical men to represent them. It is thought by some that as naval architects to shipowners increase the necessity for naval architects to the builders will become less and less. That this is not likely to happen is clear from several considerations. The first is that the general knowledge possessed by the builders' naval architect could not possibly be the property of the naval architect to the owners. In addition, there are many matters in connection with the ship for which the builder himself must be responsible, so that he is bound to retain a naval architect in his service.

THE ORDER OF THE BRITISH EMPIRE.

The following are among the promotions in and appointments to The Most Excellent Order of the British Empire (dated January 1) for services in connection with the war :—

KNIGHTS GRAND CROSS (G.B.E.).

Sir Thomas Dunlop, Bart., Lord Provost of Glasgow.

Mr. W. H. Ellis, Master Cutler of Sheffield and Director of John Brown & Co., Ltd.

KNIGHTS COMMANDERS (K.B.E.).

Sir William Bower Forwood, Director, Cunard Line.

Mr. Alexander Gracie, M.V.O., Managing Director, Fairfield Shipbuilding & Engineering Company, Ltd.

Mr. Frederick Ness Henderson, Member of the Admiralty Shipbuilding Council; Director, D. & W. Henderson & Co., Ltd.

Lieut.-Colonel Robert Stevenson Horne, K.C., R.E., Director of Materials and Priority, Controller's Department, Admiralty.

Mr. George Burton Hunter, D.Sc., Chairman of Swan, Hunter & Wigham Richardson, Ltd., Newcastle-on-Tyne.

Mr. James McKechnie, Managing Director of Vickers, Ltd., Barrow.

Mr. Frederick George Panizzi Preston, Chairman, J. Stone & Co., Ltd., Deptford.

Mr. Herbert Babington Rowell, Member of the Admiralty Shipbuilding Council; Chairman, R. & W. Hawthorn, Leslie & Co., Ltd., Newcastle-on-Tyne.

Mr. Thomas James Storey, Member of Committee and Chairman of Classification Committee of Lloyd's Register of Shipping.

Mr. William Rowan Thomson, Director of Auxiliary Ships' Engines, Controller's Department, Admiralty; Partner, David Rowan & Co., Glasgow.

COMMANDERS (C.B.E.).

Mr. Richard William Allen, J.P., Director and Manager, W. H. Allen, Son & Co., Bedford.

Mr. Bernal Bagshawe, Chairman, Leeds Forge Company, Ltd.

Mr. Hereward Brackenbury, Manager of Torpedo Shops, Sir W. G. Armstrong, Whitworth & Co., Ltd.

Mr. James Brown, Deputy-Chairman and Managing Director, Scotts' Shipbuilding & Engineering Company, Ltd.

Mr. Peter Dewar Ewing, General Manager, Ailsa Shipbuilding Company, Troon.

Mr. Summers Hunter, Member of the Admiralty Shipbuilding Council, Managing Director, North Eastern Marine Engineering Company, Ltd.

Rear-Admiral Edward F. Inglefield, R.N., Secretary of Lloyd's.

Mr. Daniel Jackson, Partner and Head of Shipyard, William Denny and Brothers, Dumbarton.

Mr. Charles Henry Jones, Registrar General of Shipping and Seamen.

Mr. William Joseph Luke, Shipyard Director, John Brown & Co., Ltd., Clydebank.

Mr. James Marr, Member of the Shipbuilding Advisory Council and Managing Director of Jos. L. Thompson & Sons, Ltd., Sunderland.

Mr. Archibald John Campbell Ross, Member of the Admiralty Shipbuilding Council; Technical Director, R. & W. Hawthorn, Leslie & Co., Ltd.

Mr. Launcelot Eustace Smith, Chairman and Managing Director, Smith's Dock Company, Ltd., Tyne Branch.

Mr. Chas. John Ough Sanders, Superintendent for Wrecks and Loss of Life at Sea, Marine Department, Board of Trade.

Mr. Harry James Webb, Royal Corps of Naval Constructors; Chief Constructor and Superintendent, Dockyard Branch, Controller's Department, Admiralty.

Mr. Alfred Woodgate, Assistant Secretary to the Ministry of Shipping.

Mr. Harold Edgar Yarrow, Director of Yarrow & Co., Ltd., Glasgow.

OFFICERS (O.B.E.).

Mr. James Allan, Chief Engineer, Ellerman Line.

Mr. Arthur Stowey Bailey, Manager, Cammell Laird & Co., Ltd., Sheffield.

Mr. George Stephen Baker, Superintendent, William Froude National Tank, National Physical Laboratory.

Mr. Henry Lothian Barge, Engineer, Bullivant & Co., Ltd.

Mr. James Rennie Barnett, G. L. Watson & Co., Naval Architects, Glasgow.

Captain Edmund Burton Bartlett, Peninsular & Oriental Steam Navigation Co., Ltd.

Captain Ernest William Bastard, British Steam Shipping Company.

Mr. Peter McLeod Baxter, Engineering Partner, McKie & Baxter, Glasgow.

Mr. Thomas Anderson Bowman, Chief Engineer, Prince Line, Ltd.

Captain Reginald Blayney Colmore, R.N., Captain Superintendent, Training Ship *Exmouth*.

Mr. H. S. Coppock, Manager, Sir W. G. Armstrong, Whitworth & Co., Ltd., Elswick.

Captain William John Dagnall, Commodore Captain, Royal Mail Steam Packet Company.

Mr. Robert Washington Dana, Secretary, Institute of Naval Architects.

Captain Frederick Barnard Elliot, Freight Manager, Royal Commission on Wheat Supplies.

Mr. James Foster, Chief Engineer, W. & C. T. Jones Steamship Company, Ltd.

Mr. Joseph Hamilton Gibson, Manager of Engineering Department, Cammell Laird & Co., Ltd; Member of Committee of the Board of Inventions and Research, Admiralty.

Mr. Archibald Gilchrist, J.P., Engineering Managing Director, Barclay, Curle & Co., Ltd., Glasgow.

Mr. William James Gordon, Engine Designer and Indoor Manager, Vickers, Ltd., Barrow.

Mr. Thomas Gowans, Senior Chief Engineer, Pacific Steam Navigation Company.

Mr. William Grant, Chief Engineer, Anchor Line.

Mr. Edward William Green, of Green & Silley, Ltd., Weir.

Mr. Godfrey Valentine Howell, Head of the Shipping Intelligence Section, Ministry of Shipping.

Mr. Sydney Herbert Kaye, Secretary of the Plate Refrigerated Tonnage Comittee.

Mr. Alfred Evans Kelly, Chief Engineer, Tatem Steam Navigation Company.

Commander Hubert Wynn Kenrick, R.D., R.N.R., Shipping Intelligence Officer, London.

Mr. Arthur Matthews, Manager, Sir W. G. Armstrong, Whitworth & Co., Ltd., Openshaw.

Mr. John McCann, Chairman of Hull Fishing Vessel Owners' Association and Port Fishery Captain.

Mr. James Macdonald, Chief Engineer, Cunard Steamship Company, Ltd.

Mr. Joseph McFarlane, Chief Engineer, Donaldson Line.

Mr. Richard McLaren, Babcock & Wilcox, Ltd.

Captain Peter McLean, Anchor Line, Ltd.

Captain Neil McNeil, Ellerman City Line.

Mr. John James McKeown, Manager, Vickers, Ltd., Barrow.

Mr. William Millar, Head of the Greenock & Grangemouth Dockyard Company.

Mr. Hervey Angus de Montmorency, Secretary, Tonnage Priority Committee; Personal Assistant to Director of Ship Requisitioning.

Mr. George Frederick Mulherion, Managing Director of the Tyne Iron Shipbuilding Company, Ltd.

Mr. Harry Edgar Parlett, Assistant Director of Ship Repairs, Controller's Department, Admiralty.

Engineer-Commander Arthur Edward Philip, R.N.R., Senior Chief Engineer, Canadian Pacific Ocean Services.

Captain Joseph Barlow Ranson, Senior Captain, White Star Line.

Mr. William Reed, Shipyard Manager at Smith's Dock Company, Ltd.

Lieutenant Maurice Ambrose Regan, R.N.V.R., Naval Transport Officer, Hull; formerly representative of W. Mathwin & Son, Admiralty Coaling Agents at Hull.

Mr. William George Riddell, partner Hastie & Co., Ltd., Greenock.

Mr. Edwin Robinson, Manager, Vickers, Ltd., Sheffield.

Mr. Frank William Ruddle, Chief Engineer, White Star Line.

Mr. William Alfred Thomas Shorto, Secretary, Auxiliary Shipbuilding Department, Admiralty.

Mr. Richard Henry Stephenson, Manager, Smith's Dock Company, Ltd., North and South Shields.

Lieut. Valentine Beardmore Stewart, late Manager, William Beardmore & Co., Ltd., Glasgow.

Captain David Taylor, Master, Donaldson Line.
Captain Thomas McComb Taylor, Master, Pacific Steam Navigation Company.
Captain William Thomas Turner, Cunard Steamship Company, Ltd.
Mr. George Frederick Tweedy, Engineering Director, Swan, Hunter & Wigham Richardson, Ltd.
Mr. Harry Walker, Clark, Chapman & Co., Ltd., Gateshead-on-Tyne.
Mr. R. A. Waters, Manager, Sir W. G. Armstrong, Whitworth & Co., Ltd., York.
Mr. William Goold Weir, partner of David Rowan & Co., Glasgow.
Major Ronald Frederick Williams, Assistant Director, Shipyard Labour Department, Admiralty.

MEMBERS (M.B.E.).

Mr. Kenneth Delmar Barrett, Outside Manager, Hawthorn, Leslie & Co.
Mr. James Stuart Beddoe, Department of Director of Dockyards and Repairs, Admiralty.
Mr. Norman Restell Cameron, Acting Shipyard Manager, Thornycroft & Co., Ltd.
Mr. Gilbert Campbell, Outside Manager, Wallsend Slipway & Engineering Company.
Mr. William Carnegie, Cammell Laird & Co., Ltd.
Mr. William Cowan, Works Manager, Palmer's Jarrow Shipyard.
Mr. George Scott Cromar, Senior, Outside Manager of D. & W. Henderson & Co.
Mr. James Daglish, Outside Manager of North-Eastern Marine Engineering Co., Ltd.
Mr. William Donald, Assistant Manager for Submarines, Vickers, Ltd.
Mr. Frederick George Dunlop, Outside Manager of Harland and Wolff's Belfast Works.
Mr. William Elliott, Outside Shipyard Manager of J. L. Thompson & Sons.
Mr. Robert Faikney, Departmental Manager of Dock Department, Fairfield Shipbuilding and Engineering Company.
Mr. John Ford, Works Manager, Parsons Marine Steam Turbine Company.
Mr. Andrew Forster, Works Manager, Engine Side, J. S. White & Co.
Mr. Robert Giles, Assistant Yard Manager, Sir W. G. Armstrong, Whitworth & Co., Ltd.
Commander Edwin William Harvey, R.N.R., Dock Master, Southampton, London & South Western Railway
Mr. Peter Hastie, Shipyard Manager, J. S. White & Co.
Mr. Robert Haswell, Secretary, W. Doxford & Sons.
Mr. George Blake Henderson, Works Manager on Engineering Side, J. I. Thornycroft & Co., Ltd.
Mr. William Ross Hutton, Shipyard Manager, R. & W. Hawthorn, Leslie & Co., Ltd.
Mr. Arthur Frederick Ilsley, Assistant Secretary of Iron and Steel Committee and Secretary of Engineering Committee.
Mr. James Robertson Jack, Works Manager, William Denny and Brothers.
Mr. Charles Fleming Jamieson, Works Manager of Royal Albert Dock Branch of R. & H. Green and Silley, Weir, Ltd.
Mr. Edmund Vaughan Jones, Principal Assistant to Shipyard Manager, Cammell Laird & Co., Ltd.
Mr. Robert Kelly, General Outside Manager, Engine Department, Alexander Stephen & Sons, Ltd.
Mr. George Langlands, Outdoor Manager, Dock Department, Engine Side, Beardmore & Co., Ltd.
Mr. Walter Mace Macfarlane, Sir W. G. Armstrong, Whitworth & Co., Ltd.
Mr. Archibald Bow Macgregor, Shipyard Manager to the Ailsa Shipbuilding Co., Ltd.
Mr. George Frank Mackrow, Inside Manager, Warship Work, R. & W. Hawthorn, Leslie & Co., Ltd.
Mr. John MacQueen, Works Manager on Machinery Side, William Denny and Brothers.
Mr. David McCall, Outside Manager of the Ayrshire Dockyard Company, Ltd.
Mr. Donald McBrayne McLachlan, Outdoor Hull Manager of Submarine Department, Beardmore & Co., Ltd.
Mr. Matthew Adam McLean, Shop Superintendent, British Westinghouse Electric & Manufacturing Company, Ltd., Manchester.
Mr. George Milne, Assistant Shipyard Manager of Hall, Russell & Co., Ltd.
Mr. John Adamson Mitchell, Dockyard Manager, Scott's Shipbuilding & Engineering Company, Ltd., Greenock.
Mr. Walter Mitchell, Engine Works Manager, Scott's Shipbuilding & Engineering Company, Ltd., Greenock.
Lieutenant Thomas Neame, Works Manager, Stewarts & Lloyds, Ltd., Birmingham.
Mr. James Henry Needham, Yard Manager, Sir James Laing & Sons, Ltd.
Mr. John Maurice Ormiston, Principal Assistant, Repair Department, Cammell Laird & Co.
Mr. James Thomas Ottewill, Warship Manager in Shipbuilding Department, Fairfield Shipbuilding & Engineering Co., Ltd.
Mr. John Arthur Rankin, Outside Manager of Engine and Boiler Works, John Brown & Co., Ltd.
Mr. George Lovely Robinson, Outside Manager, Fletcher, Son & Fearnall.
Mr. Thomas Edward Rogers, Outside Iron Manager, Swan, Hunter & Wigham Richardson, Ltd.
Mr. Edward John Skinner, Electrical Engineer, Fairfield Shipbuilding & Engineering Company, Ltd.
Mr. Alexander Smith, Assistant Shipyard Manager, Vickers, Ltd.
Mr. Harold Smith, Shop Superintendent, Mather & Platt (Ltd.), Manchester.
Mr. George Thompson, Managing Director, H. W. Ward & Co., Ltd., Birmingham.
Mr. Archibald Thomson, Outside Manager of William Hamilton & Co., Ltd.
Mr. George Vardy, Engine Works Manager, Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Mr. Arthur Ronald Vaughan, Assistant to Engineering Manager, Cammell Laird & Co., Ltd.
Mr. Edward Waggott, Sir W. G. Armstrong, Whitworth & Co., Ltd.
Mr. Charles Edmund Walker, J. Stone & Co., Ltd.
Mr. Robert Wallis, Works Manager, Wallsend Slipway & Engineering Company, Ltd.
Mr. Percy Thomas Wardle, Secretary, William Muir & Co., Ltd., Manchester.
Mr. Gerald Whiting, Yard Manager, Sir W. G. Armstrong, Whitworth & Co., Ltd.
Mr. William Wilson, Outside Manager, Northumberland Shipbuilding Company, Ltd.
Mr. George Boxall, Dockyard Engineer, Port Soudan.
Mr. Allen Calder Potts, Works Manager, Soudan Steamers Department.

It has been arranged, in order to meet the convenience of the Dominions in view of the present slowness of communications, to defer until a later date (probably March 1) the notification of the lists of appointments to the Order of the British Empire in respect of services in or for the Dominions and Colonies.

NORWEGIAN SHIPS SUNK DURING 1917.—The following official figures showing the number of Norwegian vessels lost owing to the war and their gross tonnage have been issued by the Norwegian Legation :—

Month.	No. of Ships.	Gross Tonnage.
January	14	66,484
February	11	63,084
March	66	108,608
April	64	96,513
May	19	75,397
June	14	59,986
July	33	58,241
August	21	41,305
September	19	30,800
October	19	34,577
November	13	19,092
December	22	32,775
Total	344	686,862

There were 401 Norwegian sailors killed during 1917 and 258 are missing.

GENERAL NEWS SECTION.

PERSONAL.

Sir Thomas Edward Watson, Bart., whose name appeared in the New Year's Honours List, is one of the principal partners in the firm of Pyman, Watson & Co., Ltd., shipowners and colliery owners of Cardiff, London and Paris. The new baronet is President of the Cardiff Chamber of Commerce. His business career opened at Newport on January 1, 1874, and to-day his firm are amongst the largest coal exporters in the world. For many years he was chairman of Mordey, Carney & Co., and is at present chairman of several colliery companies, a director of the Port Talbot Railway & Docks Company. In 1889, on the passing of the Newport Corporation Act for the reconstruction of the Harbour Commission, he was elected a member of the latter body, as a representative of the shipowners, and has held the office ever since, having rendered conspicuous service to the Harbour Board as chairman of the dredging committee. During the year ending June, 1901, he acted as chairman of the Board, and can claim to be the originator of the scheme for the improvement of the River Usk by dredging. He has been the shipowners' representative on the Newport Pilotage Board since 1893. He founded the Newport Shipowners' Association, and obtained the representation of Newport and Swansea on Lloyd's Register Committee. He was High Sheriff of Monmouthshire in 1911.

Sir William Henry Seager, whose name appeared in the New Year's Honours List, was born in Cardiff 56 years ago. He commenced his business life at Cardiff Docks at the age of 13. In 1893 he started as a ship store merchant on his own account, since which date his business has shown one continual growth. By hard work and force of character he has achieved his present position in commerce and national and social life. The firm of W. H. Seager & Co., with the Tempus Shipping Company, launched in 1904, controls one of the largest businesses of its kind—ship store merchants, shipowners, ship and insurance brokers, &c.—having branches at Barry and Newport, and agents at all the United Kingdom ports. The Tempus Shipping Company, with a paid-up capital of £200,000, has an excellent tax-free dividend-paying record. Sir William is Vice-chairman of the Cardiff and Bristol Channel Shipowners' Association, Vice-chairman of the Cardiff Ship Store Merchants' Association, director of the British Steamship Owners' Association, director of the North of England P. & I. Association, Member of the Executive Council of the Shipping Federation, a representative member on the Chamber of Shipping of the United Kingdom, and director of the Southern Shipping Insurance Company. He has at different times made large benefactions to public institutions.

Mr. Fred N. Henderson, who is made a K.B.E., is Chairman of D. & W. Henderson & Co., Ltd., shipbuilders and engineers, Glasgow, He was an original member of the Merchant Shipbuilding Advisory Committee and is now a member of the Admiralty Shipbuilding Council. As past-president and present vice-president of the Shipbuilding Employers' Federation he is one of the industry's most popular men and hardest war workers. His firm have built many notable steamships. They are also distinguished in yachting as the builders of the America Cup Challengers, *Genesta*, *Thistle*, *Valkyrie II.* and *Valkyrie III.*, and a number of other famous racers, including the King's cutter *Britannia* and the German Emperor's *Meteor II.*

Sir T. E. Watson, Bart.,
Of Pyman Watson & Co., Ltd., Cardiff.

Sir W. H. Seager,
Vice-Chairman of the Cardiff & Bristol Channel Shipowners' Association.

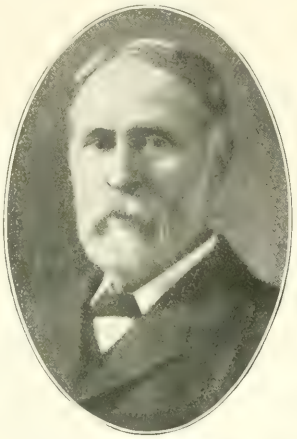
Sir F. N. Henderson, K.B.E.,
Director of D. & W. Henderson & Co., Ltd., Glasgow.

Mr. A. L. Page, underwriter of the Commercial Union Assurance Company, has been elected a member of the Committee of the Institute of London Underwriters in place of Mr. R. T. Jones, who is retiring from underwriting.

Mr. Alexander Galbraith, who for about eight years has been associated with the Cunard Company, first as Assistant Superintendent Engineer, and for the past five years as Superintendent Engineer, has been compelled on account of health to tender his resignation. Mr. Galbraith's services, however, will for the present be at the disposal of the Company in a consultative capacity. Mr. John Austin, who has been one of the Assistant Superintendent Engineers, has been appointed Acting Superintendent Engineer, while Mr. James Kendall and Mr. J. White continue in their present capacities as Assistant Superintendent Engineers.

Dr. George Burton Hunter, whose name figures in the Honours List for War Services, is the Chairman of Swan, Hunter & Wigham Richardson, Ltd. Sir George is also a director of Barclay, Curle & Co., Ltd., the Newcastle-on-Tyne Electric Supply Company, Ltd., the North British Diesel Engine Works, Ltd., and the Wallsend Slipway & Engineering Company, Ltd. He is also a member of the Committee of Management of Lloyd's Register of Shipping.

Mr. W. Rowan Thomson, on whom the King has conferred a K.B.E., is one of the highly successful business men who are serving the State for "the duration of the war." He is amongst the United Kingdom's foremost engineers, principal partner of D. Rowan & Co., Glasgow, and until recently President of the North-West Engineering Trades Employers' Association. He was an original member of the Merchant Shipbuilding Advisory Committee which evolved the standardised ships, and is now Director of Auxiliary Ships' Engines, Controller's Department, Admiralty. The Rowan Premium Bonus System, in which the King was greatly interested during his recent visit to Clydeside, was first applied in Mr. Thomson's own works. The new Knight has just published a very interesting book on the subject.



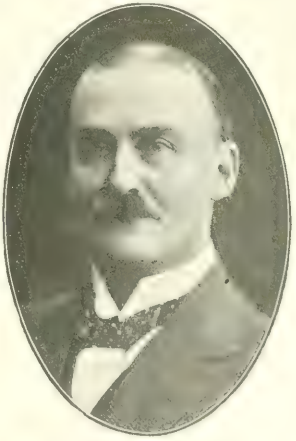
Sir G. B. Hunter, D.Sc., K.B.E.,
Chairman, Swan, Hunter & Wigham Richardson, Ltd., Newcastle.

Mr. James McKechnie, who is made a K.B.E., is one of the United Kingdom's best-known mechanical engineers and naval shipbuilders. He is Director-in-chief of the famous Vickers' armament works at Barrow-in-Furness, which he organised, and whose productive capacity has been, under his direction, enormously expanded since the outbreak of war.

Sir James McKechnie, K.B.E.,
Managing Director, Vickers, Ltd., Barrow-in-Furness.

Mr. Herbert B. Rowell, who is amongst the new K.B.E.'s, is one of the Tyne's most prominent shipbuilders. He is Chairman of R. & W. Hawthorn, Leslie & Co., Ltd., Newcastle, a member of the Admiralty's Shipbuilding Council, and generous in his service to the State in other fields. He is a past-president of the Shipbuilding Employers' Federation, and also a past-president of the North-East Coast Institution of Engineers and Shipbuilders. His firm are important naval shipbuilders as well as mercantile shipbuilders. At Hebburn they have produced light cruisers and destroyers, and at their St. Peter's Works, turbine and other types of propelling machinery for war vessels of practically every type and size.

Sir W. Rowan Thomson, K.B.E.,
Principal Partner of David Rowan & Co., Glasgow.



Sir H. B. Rowell, K.B.E.,
Chairman, R. & W. Hawthorn, Leslie & Co., Ltd., Newcastle.

Mr. William Holford Dixon, Managing Director of Harris & Dixon, has been appointed a director of the British Steamship Investment Trust.

General regret has been expressed at the retirement of Mr. Francis Henderson (of the Anchor Line) from the position of Deputy-Chairman of the Clyde Pilot Board. At a recent meeting of the Executive Committee of the Board it was agreed to recommend in their minutes an expression of regret at the retirement of Mr. Henderson, and their high appreciation of the valuable services he had rendered in the ten years he had been a member, and especially during the past five years as deputy-chairman of the Board and convener of the Executive Committee. Last week the Clyde pilots met Mr. Henderson in the offices of the Board, and presented him with a silver rose bowl as a mark of their appreciation of the interest he took in their welfare and in the efficiency of the service.

Mr. Joseph F. Fawcett, of the firm of Fawcett, Stuart & Co., shipbrokers, &c., of Holland House, 32, Bury Street, London, E.C., has taken into partnership his son-in-law, Mr. Harry Coverdale, a partner in the firm of Coverdale Brothers, shipowners, of West Hartlepool. The name of the firm will be altered to Fawcett, Coverdale & Co.

An interesting event took place last week in Belfast, when the foremen, leading hands, and a few of the workmen of the firm of Harland & Wolff, Ltd., assembled to formally bid "God-speed" to Mr. F. W. Rodger, who for the past 30 years has been prominently identified with the activities of this great concern at the Queen's Island, and who has now been transferred to their Govan yard as Plant Manager. Mr. Charles Payne, J.P., managing director, presided, and in the course of the evening Mr. Rodger was made the recipient of a handsome mahogany writing bureau and a drawing-room clock and ornaments, the presentation ceremony being performed by Mr. John Morrison, the shipyard manager. The chairman said that Mr. Rodger during his career had seen some remarkable changes in the great firm with which he was connected. He remembered when Harland & Wolff's shipbuilding activities were confined to Belfast; and he was there when they extended their works to Southampton and also to Liverpool. Now Mr. Rodger was going over to the Clyde to assist in the designing and working out of all the great arrangements there for one of the finest yards in the world.

FROM OUR CORRESPONDENTS.

CLYDE DISTRICT.

(FROM OUR OWN CORRESPONDENT.)

Coal Shipments at Scottish Ports.—The falling-off in the export trade from the Scottish coalfields, while having a rather bad effect on the industry itself, has also caused a decline in the revenue of a number of port authorities both on the east and west coasts. The east coast ports have, as a matter of course, suffered the most severely, as, prior to the war, a large part of the output of the Fife and Lothians coalfields was sent to the Scandinavian countries and to Germany. Official figures relating to the decrease in the export trade are not yet available, but it is estimated that, compared with a normal year before the war, the total export of coal for 1917 will show a decline of about 2,500,000 tons. This decrease cannot be allotted to any particular group of ports, although, as has already been indicated, Leith, Burntisland and Methil have suffered more than the coal-shipping ports on the Firth of Clyde. For the present year, as in the year which has just closed, the principal difficulty will be one of securing an adequate supply of tonnage, which, in turn, will depend largely on the activities of the enemy submarines and the ability of the shipbuilders to make good the loss of merchant vessels.

Improved Method of Steel Making.—One of the many changes which has been brought about by the war is an improvement in the method of the manufacture of steel in Scottish works, whereby purely Scottish ores are being used for the making of a good quality of steel. Prior to the war, and for some time after it broke out, most of the works in the West of Scotland were engaged in the production of high-class steel by the acid process. To do so it was necessary, however, to secure adequate supplies of Spanish or Cumberland ores, but as these are not now available in sufficiently large quantities, it was decided to adapt a number of furnaces to the production of steel by the basic process. While the steel thus produced is not quite of the same high average quality as the steel derived from the acid process, it is entirely satisfactory for most purposes. Any slight lowering of the percentage of efficiency is more than compensated for by the plentiful supply of the ore within a comparatively short distance of the furnaces. Manufacture by the acid process is still being carried on in a number of works and a sufficient quantity of steel of the highest quality is being produced for all purposes for which it is essential.

Close of Clyde Holidays.—The New Year holiday period in the Clyde area terminated at the end of last week, and work was resumed in the shipyards and engineering and munition-making establishments on Monday. The start was a good one, much better than in one or two former years, when the holidays were curtailed owing to pressure of work. Nevertheless, there is always a percentage of laggards who take a day or two more than the prescribed period, but this year the number was smaller than usual. While nothing can be said of the nature of the work being done, it is of interest to note in passing, that the staffs of practically all the shipyards have been greatly strengthened during the year, and the process of increasing the labour supply is still being carried on. From the fact that more men are being employed in the Clyde area than before the war, it may be inferred that the output of the district is correspondingly increased. As was indicated in this column last week, the supply of material for shipbuilding purposes is also good, much better, in fact, than it was at the corresponding period of 1917. The industry, therefore, enters on a new year with every prospect of attaining a huge output before the close of 1918.

NORTH-EAST COAST DISTRICT.

(FROM OUR OWN CORRESPONDENT.)

Big Shipping Deal.—The rumour freely circulated in Newcastle on Friday afternoon last that a big shipping deal had just been completed in the city. In the course of the day it was authoritatively confirmed that the transaction had been successfully piloted through by Mr. A. Munro Sutherland, the chairman of the Sutherland Steamship Company and associated undertakings, and that the purchases of steamers effected involved a sum of upwards of a million sterling. Particulars of the ships or the line to which they belonged were not disclosed.

War Bonds for Workmen.—Never in the annals of Tyne shipbuilding has there been so remarkable a gathering of veteran workmen belonging to a single firm as that which took place in Newcastle on Friday last, when 800 employees of Swan, Hunter & Wigham Richardson, Ltd., Wallsend and Walker, with over 20 years' service, were each presented by the company with a war bond for £10. In cases of the very oldest servants the gift is to be increased up to £25. A caulker with 53½ years' service headed the list, and the next was a joiner with 51½ years' service. Dr. G. B. Hunter, the chairman of the company, who presided, is the senior director, with 38 years' service, and Mr. Winstanley, joint secretary, the oldest official, with 40 years' service.

The 12½ per cent. Advance.—Representations have been made to the shipbuilding and engineering employers on the North-East Coast respecting the 12½ per cent. advance, recently granted by the Ministry of Munitions, and men who have changed their employment between the making of the Order in October and the payment of the increase, which in some cases was paid in the last week of the old year and in others in the first week of the new. There are always some fluctuations in labour in the shipyards and the engine shops as one contract is completed and others are begun and are in various stages of construction, and the men referred to have not, it is claimed, gone to trades different from those upon which they are ordinarily engaged, but have merely moved to other Government work as the circumstances in the industries have made their services welcome. Some of these men have been excluded from the advance because they have changed their employment, and this is being strongly resented and the trade unions concerned have laid the grievance before the employers' associations. It is contended by the workmen that they are entitled to the 12½ per cent. over the whole period as the employer is only the medium through which the increase is being paid on behalf of the Ministry of Munitions.

MERSEY DISTRICT.

(FROM OUR OWN CORRESPONDENT.)

Purchase of Steamers.—It is generally understood here that nine new steamers, each of about 9,000 tons deadweight, have been bought or contracted for by the Blue Funnel Line (Alfred Holt & Co.), with several shipping or shipbuilding firms of Japan. It is said a representative of the firm has closed negotiations for the purchase of the *Yone Maru No.* 2, 7,000 tons gross, from Suzuki & Co., of Kobe, and others of similar size from the Hashimoto S.S. Co. of Kobe.

H.M.S. "Conway" Cadets.—The Admiralty have just notified the Mercantile Marine Service Association that seven of the candidates put forward from the cadet ship, H.M.S. *Conway*, have passed the examination for entry into Dartmouth. These are Cadets H. Vickers, of London; J. H. Jenkins, Southsea; R. F. A. Redman, London; E. R. J. Brown, Belfast; J. N. F. Haigh, Harrogate; D. H. T. L. Jenkins, Anglesey; and J. K. Thorpe, Ross, Herefordshire.

Department of Commercial Intelligence.—Liverpool is one of the ports selected for the establishment of a branch of the Department of Commercial Intelligence, which has been set up to foster British trade interests abroad. An essential part of the scheme is that each branch should work in close co-operation with the local Chamber of Commerce, but in Liverpool the claim is put forward by certain commercial men that they are well able to undertake the work themselves. What does not commend the scheme to Liverpool business men is that the Intelligence Department will be under the Board of Trade, a Ministry which is entirely out of sympathy with the ideals of Liverpool business men.

Military Honours.—Among Liverpool shipping men who are recipients of New Year military honours are Lieut-Colonel Wilfred T. Dodd, D.S.O., who is made Brevet-Major. He is the only son of Mr. W. H. Dodd, managing director of the Liverpool and North Wales S.S. Company, Ltd. Commander W. Marshall, D.S.O., R.D., R.N.R., who receives a Bar to the D.S.O., is an "old *Conway* Boy," and before entering upon war duties in the R.N.R. was in command of one of the Australian liners of the White Star Line. Captain James G. B. Beazley, who has been awarded the Military Cross, is the eldest son of Mr. Edwin Beazley, and is a partner in the well-known shipping firm of Gracie, Beazley & Co., Liverpool. Captain W. E. Beazley, M.C., son of Mr. J. H. Beazley, director of the Cunard Company, is promoted for distinguished service in the field to Brevet-Major.

SOUTH WALES DISTRICT.

(From Our Own Correspondent.)

District Maritime Boards.—With a view of setting up machinery for the settling of any local differences and disputes that may arise in connection with the employment of sailors and firemen, the Ministry of Shipping have instituted district maritime boards, the panels of which will consist of three representatives of both the shipowners and of the seamen. At a meeting of the Executive Committee of the Shipping Federation (Cardiff Branch), held on Thursday, the following were elected to act on the respective panels:—Panel on General Cargo Carriers.—Mr. W. W. Jones, Mr. Dan Radcliffe and Mr. John Cory. Panel on Short Sea Traders.—Mr. W. W. Jones, Mr. J. T. Duncan and Mr. Frederick Jones.

Swansea Shipping Trade.—In the annual report of the shipping section of the Swansea Chamber of Commerce it is stated that the past year's working has been increasingly important. The membership has been increased, and it is felt that the coal exporters' section could be strengthened on similar lines, as the two sections working together would have many advantages. The Coal Trimming Disputes Board have dealt with 56 claims through the Chamber. The section has been in close touch with many Imperial matters, and also agitated strongly and successfully for the appointment of a Naval Transport Officer to save the loss of time involved through captains of vessels having to go to Cardiff for navigation orders.

Arbitration Awards.—A question of demarcation of work between boilermakers and engineers employed by the Prince of Wales Dry Dock Company (Swansea), Ltd., was referred to arbitration. The award of the arbitrator (Mr. W. H. Whiting, C.B.) states that the engineers' claim to work of fixing and securing gun pedestals of merchant vessels, where such pedestals have to be bolted, is in accordance with Bristol Channel Ports demarcation rules of October 23, 1900 Riveted structure built into the ship for supporting the gun pedestal is boilermakers' work, and fitting and bolting thereto of the pedestal and packing ring is engineers' work. Mr. W. Dodd was the arbitrator in a question of demarcation work with regard to false floors, magazines, decks and deck houses, raised by shipwrights and joiners at Barry Docks. The award states: Tops of temporary or isolated houses whose thickness does not exceed 1⅛ in. to be done by joiners. Shipwrights to lay all house tops when caulking is required. False floors to be fitted in isolated houses partly used for living and sleeping accommodation and not exceeding 1⅛ in. in thickness to be done by joiners; above 1⅛ in. in thickness to be done by shipwrights. Magazines or ammunition lockers fitted in isolated houses, lazarette, or store rooms adjoining cabins not exceeding 1⅛ in. in thickness to be done by joiners; above 1⅛ in. in thickness to be done by shipwrights. Mr. Dodd's award in a Newport case was that joiners are to do horse stalling required at this port; but if the fitting up of horse stalls be started on a vessel outside Newport by shipwrights, and the vessel is afterwards sent into this port for any reason, then the shipwrights are to complete the work began by them. This arrangement to apply for period of the war without prejudice to the question afterwards.

BELFAST DISTRICT.

(From Our Own Correspondent.)

Representation of Corporation on Harbour Board.—A movement is on foot on the part of a section of the members of the Belfast Corporation to secure representation of that body on the Harbour Board. The Land Committee has had the subject under consideration, and at the meeting of the Corporation last week the Lord Mayor said that perhaps something could be done in the matter. The Lord Mayor of the city for the time being is *ex officio* a member of the Harbour Board, but it has not been their custom to attend its meetings. If it is decided to press for representation an effort will be made to arrange the matter in connection with the promotion of the new Harbour Bill in Parliament.

Trade of 1917.—The downward tendency in the traffic returns for the port of Belfast since the war began is again exemplified in the 1917 tonnage figures. During the year the total tonnage of vessels arrived was 2,323,938 tons, of which 1,944,629 tons were cross-channel and coastwise and 379,309 tons foreign. The figures for 1916 were 2,162,736 tons cross-channel and coastwise and 479,833 tons foreign, making a total of 2,642,569 tons, or 318,031 tons more than last year. The decrease is entirely due to war conditions, which during the year caused considerable interruptions to sailings.

The 12½ per cent. Bonus.—The shipyards are again in full swing after the holidays, and a brisk year's work is assured. The men made a good start after the holidays, but on New Year's Day a number did not put in an appearance. Wages are unprecedentedly high, and the amount of money paid out weekly is now higher than ever. The platers, riveters and other piece-workers of the Boilermakers' Society, who went on strike for the 12½ per cent. bonus which has been bungled so completely by the Government, returned to work last Wednesday pending decision as to whether or not the award shall be extended to them.

THE FREIGHT MARKETS.

(From Our Own Correspondents.)

London.—Chartering business on the Baltic Exchange has been far from active, but rates are steadily held in all directions. It is still from the East and the United States that the demand for tonnage chiefly comes. Homeward from the River Plate rates are unaltered for restricted tonnage at 140s. from the down-river and 145s. from the up-river ports to the United Kingdom. Neutrals can obtain 200s. and possibly more. From the ports of the North American Atlantic seaboard tonnage is in request for heavy grain, and 50s. is quoted to the United Kingdom, 56s. 3d. to France, and up to 75s. to Italy. A good demand also prevails for vessels on net form of charter, for which class of business 230s. offers to the United Kingdom, 260s. to France, and 360s. to Italy. For Gulf loading 30s. additional would be paid. Coal cargoes from Virginia to the Plate are not pressed and the rate is about 117s. 6d. For nitrate 180s. to the United Kingdom or 200s. to the Mediterranean would be paid. Neutral tonnage is keenly competed for at the Eastern ports. Rates remain on the same high level. From Karachi to the United Kingdom on scale basis 250s. is quoted, and from Bombay on deadweight 275s. to the United Kingdom and 400s. to the Mediterranean. Kernel cargoes, from Madras Coast to Marseilles, are worth 550s., but the rice ports of Burmah and Saigon are indicating no more than 500s. to the United Kingdom or France. Salt cargoes could be worked from Torrevieja to Chittagong at 90s. In the Mediterranean section of the market rates are unaltered and are based on 45s. Huelva to the Mersey; 60s. Huelva to the East Coast United Kingdom for pyrites; 50s. Bougie to the Clyde, and 65s. Tunis to the same destination; and 50s. Bilbao to Boulogne. Bay rates are indicated by fixtures at 20s., Bordeaux to Bristol Channel.

Glasgow.—At Glasgow business has been duller than usual throughout the week, and the market appears still to be suffering from the effect of the holidays. In both homeward and outward markets rates continued firm, but owing to the absence of free tonnage business was poor. The only fixture of interest reported was a time charter in the general trades, 5,400 at 43s. 6d., 12 months.

Newcastle-upon-Tyne.—Tonnage has been in small and very unsatisfactory supply during the past week and, despite the fact that the production of coal has been short in consequence of the New Year holidays, the volume of shipping available has hardly sufficed to take up the output. At the time of writing, the normal shortage is being accentuated by delays of stemmed vessels due to wintry weather and the collieries have hard work to keep going with any degree of regularity. Orders for all Allied and neutral directions with which we nowadays trade are very numerous and pressing, but many of them are having to remain unfulfilled for the time being. The chartering this week has been confined to a few fixtures for French Atlantic ports at scheduled figures and to the following engagements of tonnage for Swedish destinations:—Gothenburg, 2,500, 180 kr.; and 2,100 182½ kr., option Stockholm, 195 kr.; and Stockholm, 1,850, 195 kr. From these it will be observed that Stockholm is distinctly firmer on the week, but that Gothenburg is rather easier. There is a considerable pressure of tonnage for coasting ports, on the basis of about 21s. 6d. to London, an advance of 1s. 6d. on the week, but no fixtures for that destination are reported. To the Spanish Atlantic, 180s. is firmly quoted for Bilbao or Santander, with the Spanish Mediterranean steady at 300s. to Barcelona. Portuguese ports are well maintained at the recently-increased rates of 115s. to Lisbon and 125s. to Oporto. The coaling stations are steady at 100s. to Gibraltar and 200s. to Port Said.

Liverpool.—Quiet conditions still prevail on this market, due to tonnage scarcity. Rates keep very firm, and there is a brisk inquiry, but with ships so much under control, business is only possible to Allied ports, and that is, strictly speaking, limited. Neutrals are

consequently out of the market, notwithstanding the very high rates they offer. There is a good inquiry also for time charters, and 49s. has been paid in the general trades for a handy boat of 1,700 tons d.w. for twelve months, and 43s. 6d., twice, for larger steamers of 2,200 tons d.w., and 5,200 tons d.w. respectively, the former a continuation time charter, and the latter for twelve months. In the homeward trades rates are quite firm all round, though with tonnage most difficult to get, prices are rarely tested. Even 800s. offering Philippines to Marseilles, copra basis, 550s. Madras Coast to Marseilles, and 240s. Kohsichang or Rangoon to Havana, fail to attract transport. North America keeps very firm for all classes of cargo, and grain from the Range ports is still quoting 50s. to United Kingdom, 56s. 3d. to France, and 75s. to Italy. Net charters are possible at 250s. to United Kingdom, though the lower figure of 230s. has been paid for a 4,000-ton, boat New York to Liverpool. February-March River Plate, homewards, quiet and unchadged, 200s. indicated for neutrals to United Kingdom.

Cardiff and Swansea.—There has been more activity shown on the outward coal freight market than for some time past. An active inquiry was in evidence, and rates were firmly maintained. As usual, the majority of the transactions disclosed were for France, and included Havre twice at 22s. 6d. (allied) and 45s. 9d. (neutral); Brest, 45s. (neutral); Caen, 46s. 6d. and 48s. (neutral); St. Malo, 22s. 6d. (allied); St. Nazaire, 61s. 6d. (neutral); and Bordeaux, 69s. (neutral). Gibraltar was done at 100s., and Dakar paid 85s. for an allied steamer and 90s. for a neutral vessel. On the Swansea market a strong tone prevailed in all departments, the demand for tonnage being on a brisk scale. Rates were easily upheld for all directions. The transactions reported were: Dublin, 22s.; Caen, 46s. 6d. (neutral); Rouen twice at 48s. 9d. (neutral) and 24s. 6d. (allied); La Rochelle (Port Talbot loading), 61s. 6d. (neutral); and Neath Abbey to Cork at 25s.

THE COAL MARKETS.

(FROM OUR OWN CORRESPONDENT.)

The coal markets have now recovered from the holiday influence and even the Scottish markets which were affected for a longer period than the English and Welsh markets, are getting over the week's stoppage in the coal field which was caused by the Scottish New Year holiday. In some respects the holidays have been of value to the markets, because they have permitted an improvement to be made in transport facilities, this applying especially, of course, to the North-East Coast and South Wales. There has, as a result, been a reduction of the excessive stocks which were carried by some collieries, and an impression has been made on the huge accumulations of small coal in South Wales.

The markets are not, however, very strong in tone, and business is sluggish. Inquiries there may be and indeed are, but new transactions are very slow to be put through, and at the coal exporting ports the trade follows very much on the old lines.

Very little has been doing in the bunker coal trade, the tone of which is consequently rather weak, and plenty of bunker fuel is to be had at minimum prices. Some impression has been made on the large stocks of small coals, suitable for bunkers, in South Wales, but smalls are still in superabundant supply.

On the North-East Coast Durham bunkers are plentifully offered at 24s. to 27s. 6d., but specials are still scarce and easily realise 30s. for export. Bunker coal values in South Wales range from 18s. to 22s. 6d.

The North-East Coast coal markets are without animation, although a good many inquiries have been circulating. Whether or not business results depends on the facilities for transport which are in prospect. At the moment these are not very bright, stormy weather and snow having interfered with shipping as well as the railways. There is plenty of coal of all descriptions on offer and no doubt business could be done if the outlook was more assured.

The market is quite steady for steam coals of the best class, the house coal trade is quite prosperous, and for Durham gas coals the demand is improving. The home trade all round is fairly satisfactory.

Approximate quotations are for Best Blyth steams, 30s. to 32s. 6d., and smalls, 18s. 6d. to 20s. 6d.; Tyne primes, 29s. 6d. to 32s. 6d., and smalls, 25s. to 27s. 6d.; second steams, 25s. 6d. to 29s. 6d., and smalls, 18s. 6d. to 20s 6d.; unscreened steams, 24s. to 25s.; smithies, 25s. to 30s.; nuts, 32s. 6d. to 33s. 6d.; Durham gas coals, 25s. to 30s. for best and 23s. 6d. to 26s. for second; coking coals, 17s. to 25s.; house coal, 20s. to 22s. 6d.; bunkers, 24s. to 27s. 6d.; special bunkers, 30s.; foundry coke, 42s. 6d. to 45s.; and blast furnace coke, 35s. 6d.

The South Wales coal markets are in a depressed condition. Inquiries have been rather conspicuous by their absence, and of fresh business there has been none to speak of. Even steam coals of the best quality are in abundant supply, while seconds, and especially smalls, are much in excess of the demand. The collieries are, consequently, working irregularly, except those producing gas and hard coals, which are able readily to dispose of the productions of their pits.

Prices, subject to the addition of the 2s. 6d. per ton war wage increase, are, for best steams, 33s.; seconds, 30s. 9d. to 31s. 6d.; ordinary steams, 30s.; drys, 28s. 6d. to 30s.; steam smalls, 18s. 6d. to 22s. 6d.; best large Black Veins, 30s.; Western Valleys, 29s.; Eastern Valleys, 28s. to 29s.; nuts 28s. 6d. to 30s.; duff 14s. to 18s.; house coal, 30s. 9d. to 33s.; No. 3 Rhonddas, large, 30s. 9d., and smalls, 26s.; No. 2 Rhonddas, large 27s., and smalls, 17s. to 19s.; through and through coal, 22s. to 23s. 6d.; gas coals, 21s. to 25s.; and patent fuel, 30s.

On the Liverpool coal market quiet conditions prevail. Though the supplies of coal coming forward are on the short side, owing to the holiday stoppages at the collieries, the demand is small, and matters are, therefore, well balanced. The export trade is dull, but the inland demand is remarkably good for all classes of Yorkshire, Lancashire and Derbyshire fuel.

The Scottish coal markets have barely got over the New Year holidays, and consequently trade is not up to the average, which is by no means great. At the close of last year the Scottish coal trade was showing a little improvement, but this has vanished for the time being, though it will probably return. The home requirements are still very brisk, but the export trade for the time being is poor.

Prices are, with the addition of the 2s. 6d. per ton war wage increase, 28s. to 30s. for splints; 29s. for Hartleys; 26s. to 28s for Ell coal; 28s. to 30s. for screened Navigations; 25s. 6d. to 29s. for unscreened Navigations; 27s. 6d. for best screened steams; and 21s. to 23s. for nuts.

There is no change to record in regard to the Hull coal market. On the Coal Exchange operators are endeavouring to procure fuel, which the collieries are unable to supply, and consequently there is a general scarcity of all classes of coal. All the steam coal raised in the immediate neighbourhood is ear-marked for the authorities, and other classes are fully absorbed inland. Prices keep very firm.

The Midland coal trade is again, following the Christmas holidays, very busy. The collieries are unable to do more than supply current requirements of consumers, notwithstanding that the manufacturing centres were stopped for the Christmas holidays two or three days longer than the pits. The demand for fuel of all kinds is particularly strong and no surplus supplies are available.

On the London Coal Market the attendance has been small, but there has been a good trade passing, especially for house coal, which, having regard to the cold spell, has been in urgent demand. Indeed there has been a greater call for coal than has been met by the supplies coming forward, and merchants have been obliged to draw on stocks.

COMPANY MEETINGS.

Tatem Steam Navigation Company, Ltd.—The seventh annual meeting was held at Cardiff on December 31. The chairman, Sir W. J. Tatem, in moving the adoption of the report, said that shipping was now practically all under Government control. The policy of the Ministry of Shipping was not altogether free from criticism, but it was realised they were doing their best under exceptional circumstances, and boldly wrestling with problems of an unprecedented nature. It was to be hoped that the Shipping Controller would take a wide view of the responsibilities of shipping companies, so that nothing should handicap the shipbuilders and shipowners after the war. Since the inauguration of the company, dividends had been distributed amounting to 100 per cent., and the company's finances were in a sound condition. The reserve funds were all invested in War Loan, but the fleet had been so much reduced that he doubted if those funds would be sufficient to replace their tonnage at present contract prices. All the company's vessels were requisitioned at Blue Book rates. Owing to the heavy increase in working charges, a large number of steamers were now compelled to face a heavy loss.

Mr. W. Hurford seconded the motion, which was carried.

COMPANY REPORTS AND DIVIDENDS.

Clan Line Steamers, Ltd.—The directors announce that warrants for the payment of the dividend on the preference shares, due January 1, have been posted.

W. & C. T. Jones Steamship Company, Ltd.—The directors have paid an interim dividend of 1s. per share, free of income tax, being 10 per cent. per annum, as against 20 per cent. last year.

Manchester Dry Docks Company, Ltd.—The dividend for the past year is now brought up to 18½ per cent., free of tax; the 1916 dividend was at the same rate, but only the interim dividend of 5 per cent. was paid free of tax.

Helredale Steamship Company, Ltd.—The balance at credit of profit and loss account to November 15 last, after deducting the interim dividend of 10 per cent., amounts to £7,791, and this has been dealt with by transferring £6,032 to reserve and depreciation fund, including provision for war taxation, making £37,500; paying a further dividend of 5 per cent. (£1,250), making 15 per cent. for the year, free of income tax, and carrying forward £509.

Scarisbrick Steamship Company, Ltd.—The report for the year ended December 9 last states that the amalgamation of the company with the Rosella Steamship Company was completed last March. After providing for excess profits duty, &c., the accounts show a balance to profit and loss of £16,495, to which must be added the amount brought forward, making a total of £16,942. From this has to be deducted an interim dividend of 12½ per cent., less income tax, paid in July last, leaving a balance of £7,567. The directors now recommend a final dividend of 7½ per cent., less tax, absorbing £5,625, leaving £1,942 to carry forward. Working expenses are continually increasing, and the cost of stores, provisions, insurances and repairs are enormous.

Temperley Steam Shipping Company, Ltd.—The report states that the profit for the year ending May 31, 1917, was £24,774, which, with the amount brought forward, gave a balance of £28,158. The interim dividend paid on March 31, 1917, absorbed £5,652; £5,000 has been carried to reserve and depreciation, and the directors recommend a dividend of 4s. per share, which will amount to £11,304, leaving a balance to carry forward of £6,202. The excess profits duty for 1915-16 was £37,598, and £10,000 on account of this was paid before May 31, 1917; the balance has been paid and charged to reserve for taxes. The balance standing to credit of that account is sufficient to meet the estimated excess profits duty for 1916-17, which was payable on January 1, 1918.

COMPANY REGISTRATIONS.

Ernest Johnson & Co., Ltd.—Capital, £20,000, in £10 shares. Objects: To build, acquire, fit out, refit, work, manage, let on hire or on charter, repair, sell, exchange and deal with steam and other ships and vessels, tugs, trawlers, landing and other boats and craft of all kinds, &c. Signatories:—

E. Johnson, 88, Book Road, Glasgow, engineer.
D. O. Donnell, Greenacre, Bothlerry Road, Goole, mechanical engineer.

Permanent directors: E. Johnson, D. O. Donnell and A. B. Johnson. Private company.

David Rowan & Co., Ltd. Capital, £400,000, in £10 shares. Objects: To take over the business of D. Rowan & Co., marine engineers, boilermakers, &c. Signatories:—

Jas. Lithgow, Kingston Shipbuilding Yard, Glasgow.
Henry Lithgow, Kingston Shipbuilding Yard, Glasgow.
W. B. Thomson, 231, Elliot Street, Glasgow.
J. G. Young, 231, Elliot Street, Glasgow.
W. G. Weir, 231, Elliot Street, Glasgow.
W. Tod, 231, Elliot Street, Glasgow.

The first directors are:—J. Lithgow, H. Lithgow, W. J. Weir, W. Tod, W. R. Thomson and J. G. Young. Registered office: 231, Elliot Street, Glasgow. Private company.

Lombard, King & Co., Ltd. Capital, £100, in £1 shares. Objects: To insure against marine and aircraft risks, to act as insurance brokers and agents, &c. Signatories:—

H. Steele, 38-40, Lloyd Street, Manchester.
A. Whitworth, Foreign Bay, Accrington, Manchester Underwriter.
W. Proctor, 28, Brazennose Street, Manchester, solicitor.
G. A. [illegible], Worsley Avenue, Chorlton-cum-Hardy.
J. Speakman, Langley, 8, Worsley Road, Worsley, accountant and auditor.

The first directors are to be appointed by the subscribers. Solicitor: W. Proctor, 30, Brazennose Street, Manchester. Private company.

AVERAGE FREIGHT RATES.

The following estimated average rates of freight paid for steamers in the open market, from Tyne, Blyth, Wear, Seaham and West Hartlepool, also homewards from principal ports, during the years 1917, 1916, 1915 and 1914, have been compiled by Cairns, Noble & Co., Ltd., steamship owners and brokers, of Newcastle-upon-Tyne and Cardiff:—

MEDITERRANEAN, &c.

	1917.	1916.	1915.	1914.
	s. d.	s. d.	s. d.	s. d.
River Plate ..		47 3½	30 6½	15 9
Port Said ..		84 8½	32 3	11 1½
Alexandria		84 3	46 10	8 3½
Piræus			37 1½	9 11½
Venice			46 3	12 2½
Ancona			36 6	11 8½
Malta ..		75 9	33 9½	8 5½
Porto Ferraio	62 6*	83 3	38 3	9 8½
Palermo	67 6*	79 6	38 10½	10 7½
Catania	67 6*	84 6	36 8	9 6½
Naples	62 6*	82 4	37 7½	8 11
Civita Vecchia	66 0*	85 6½	35 8	10 5½
Leghorn	64 6*	83 9	37 1	8 11½
Genoa Savona	64 6*	83 2	37 8	9 10
Marseilles	63 6*	80 6½	34 8½	9 5½
Cette .. " ..	65 0*	81 8½	33 0½	8 2½
Barcelona	202 0	65 8½	32 11½	10 0½
Valencia	175 0	63 9	28 4	9 7½
Carthagena ..	180 0	63 6		9 5½
Malaga	180 0	66 2½	31 8	9 2
Gibraltar	81 10½	13 8½	24 7½	8 0½
Algiers ..	53 6*	56 10	27 2½	8 1½
Oran	53 6*	58 0	28 5½	8 5
Cadiz		63 2	26 8	9 2½
Seville			25 6	8 6
Lisbon	82 6	44 2½	24 1½	7 7
Oporto	—	50 3	25 0½	8 0½
Islands (Canary)	56 3	40 8½	24 9	8 7½

BAY PORTS.

St. Nazaire ..	35 0*	50 2½	23 1	6 9½
Rochefort	35 0*	51 6½	24 0	6 4
Bordeaux	40 0*	51 8½	24 2½	7 2*
Santander	—		—	6 5
Bayonne	42 6*	53 7½	24 7½	6 9
Bilbao	150 0	44 0½		6 2

For 1916 the rates are compiled up to the end of October. For the year 1917 we gave the "Limitation" rates which came into force for British ships in November 1916, for Mediterranean ports, and in May 1916, for French Bay ports. Neutral vessels have been chartered for Mediterranean ports at rates passed by British authorities considerably over "Limitation" figures. For Neutral vessels "Limitation" rates for French Bay ports after prolonged deliberations were increased in April, 1917, by 50 per cent. plus less over the rates fixed for British ships.

BALTIC, &c.

	s. d.	s. d.	s. d.	s. d.
Cronstadt				4 6½
Reval ..				4 1½
Riga ..				5 0½
Libau ..				4 11½
Helsingfors				4 7
Memel				4 3½
Pillau ..				4 4
Fahrwater				4 5½
Swinemunde				4 4
Stettin ..				4 6
Lubeck				4 9
Aarhus				4 —
Kolding				3 6
Hjörnö				
Stockholm	—	—		—
Malmo	—	—		7 3
Norrkoping	—	—		10 1½
Copenhagen	—	—		8 3½
North of Norway	—	—		

We do not give Baltic rates for 1914, 1916 and 1917, as practically no chartering for Scandinavian ports were arranged abroad.

COASTING, &c.

	s. d.	s. d.	s. d.	s. d.
London	15 9	13 8	10 0	5 10*
Plymouth				6 0
Rotterdam				4 3
Antwerp		—		4 7½
Hamburg				4 3
Boulogne	26 6*	26 6*	17 11½	4 3*
Dieppe	26 6*	26 6*	17 8½	5 7
Havre ..	26 6*	25 6*	17 11½	6 11½
Rouen	27 6*	27 6*	18 9	6 8
Caen	26 6*	26 6*	17 8½	7 1
Cherbourg	26 6*	26 6*	18 9*	6 6

* Estimated rates.

For the year 1916 we give for North French ports the "Limitation" rates which came into force in May. For the year 1917 we give the "Limitation" rates for British steamers. After prolonged deliberations these rates were increased for Neutral vessels in April, 1917, by 50 per cent. plus 12s. For North French ports, not beyond Brest, the "Limitation" rates were increased by 1s. per ton for steamers not exceeding 1,000 tons cargo, and reduced by 1s. per ton for steamers exceeding 2,500 tons cargo.

HOMEWARDS.

	s. d.	s. d.	s. d.	s. d.
Calcutta to U.K. or Continent	325 0	174 11½	67 10½	22 0
Karachi do.	209 8	110 5½	49 3	14 4½
Rice Ports do.	—	169 10	76 10½	22 9½
Bombay do. (DW.)	280 11	131 3½	62 9	18 11½
Madras Coast to U.K. or Continent	—	—	79 7	24 7½
Odessa, &c., direct	—	—	—	6 8½
Do. N/C. ..	—	—	—	10 7
Azoff, any	—	—	—	8 1½
Do. N/C.	—	—	—	10 2½
Danube	—	—	—	7 10½
Do. N/C.	—	—	—	8 3
Sulina, direct	—	—	—	7 8½
Do. N/C	—	—	—	8 5½
New Orleans/Galveston to U.K. or Continent (net charter)	—	—	—	15 6
Pensacola to U.K. or Continent	—	—	—	82 6
River Plate (lower ports) to U.K. or Continent.. ..	150 0	141 4½	66 0½	16 3½
River Plate (San Lorenzo to U.K. or Continent, ..	154 10	142 2½	69 2½	18 4½
Bilbao to Tyne 40 0*	20 0	20 6½	14 4½	4 6
Do. Rotterdam —	—	—	—	4 1½
Do. M'bro .. 40 0*	20 0	20 4½	13 11½	4 9½
Do. Clyde .. —	—	20 5½	11 8½	4 7
Huelva/U.K./Continent ..	—	—	16 2	6 11½
Benisaf do. ..	—	—	16 7	7 3½
Archangel to London or E.C.		258 4	—	45 8½
Lower Bothnia to London or E.C. Deals	—	—	—	28 0

From Bilbao to U.K. for 1917 we give "Limitation" rates which came into force May, 1917.

* Rates for Neutral vessels (other than Spanish).

NEWS PARAGRAPHS.

Steelworkers' Wages.—Consett steelworkers' wages have been advanced a further 2½ per cent., completing a total increase of 50 per cent. since the beginning of the war.

Shipyard Expansion.—Swan, Hunter & Wigham Richardson propose considerably to extend their Wear shipyard, and steps are to be taken to enlarge No. 1 graving dock at that port.

Larger American Ship Programme.—A Reuter message from Washington states that Mr. Hurley, Chairman of the Shipping Board, has asked Congress to appropriate £16,400,000 for the acquisition or construction of shipbuilding plants, in addition to the £33,000,000 previously asked for the next fiscal year. Authority is also sought to construct ships to a total value of £387,000,000, instead of the £246,800,000 already provided for this purpose.

Shipbuilding at Chepstow.—The Admiralty have decided not to set up a fourth national shipyard, but to utilise the banks of the River Wye between the Chepstow and Beachley yards. There will be no fewer than 33 slipways at Chepstow and Beachley and the remainder at Portbury, in addition to six at Finch's yard, Chepstow. Thus, Chepstow will have no rival as a large shipbuilding centre. It is intended to erect large workshops at Chepstow and Beachley.

Partnership Dissolution. — Camps & Collins, consulting engineers, naval architects and marine surveyors, announce that the partnership which has existed between them has been dissolved as from December 31, 1917. The dissolution has been effected by mutual consent for the reason that each partner is satisfied that their respective sides of the business can be more satisfactorily conducted apart. The business will, in future, be conducted by Mr. H. E. J. Camps, under the style of Camps & Co., 21, Great St. Helens, London, E.C.3.

Tower Bridge Signal Station.—The Bridge House Estates Committee of the City of London Corporation recently proposed to dispense with the Tower Bridge signal station on Cherry Garden Pier, which was established, among other things, to receive and transmit intimations from upward-bound vessels in order that the bascules of the bridge might be raised in sufficient time to admit of their passage. The Port of London Authority, on being invited to amend the River By-Laws, has come to the conclusion that the maintenance of the signal station is necessary for the safety of navigation, and has received a similar expression of opinion from Trinity House, the London Short Sea Traders' Association, and the Association of Public Wharfingers. In these circumstances the Port Authority has asked the Bridge House Estates Committee to reconsider its proposal.

Atlantica Shipping Company, Budapesth.—The proposal to increase the share capital from £333,333 to £459,000 by the issue of 15,000 shares, has been accepted.

South Dutch Union of Shipbuilders.—The association has been formed with headquarters at Leyden, in order to represent the economic interests of the yards concerned.

A Hulk Re-purchased!—A Gothenburg owner was recently offered for £21,000 a barque whose year and tonnage seemed very familiar. Investigation showed that the prospective purchaser had sold the vessel as a hulk for £1,440 in March, 1914!

Soc. Anonyme Belge de Navigation Fluviale, Antwerp.—This company, belonging to the Rhenania concern, is raising its capital from £106,500 to £196,000 by the issue of 3,650 shares at 110 per cent.; these shares will rank for 1917 dividend and part of them will be offered to old shareholders in the ratio 1 : 2.

Purchase of Steamships.—It is announced that Mr. A. Munro Sutherland, of the Sutherland Steamship Company, Newcastle-on-Tyne, has purchased steamers representing over £1,000,000. In May of last year, Mr. Sutherland acquired three steamers, representing about 11,600 tons gross from J. H. Buckingham & Co., at a price stated to be £250,000.

Norwegian Receipts.—The total receipts of Norwegian owners from oversea traffic (*i.e.*, excluding coastal shipping) were as follows during the ten years 1907-1916 :—

	£		£
1907	7,680,000	1912	10,400,000
1908	7,550,000	1913	12,000,000
1909	7,200,000	1914	11,680,000
1910	7,700,000	1915	26,100,000
1911	8,890,000	1916	58,500,000

The increase was not inconsiderable during the seven years preceding the war. Since, it has been—Scandinavian!

Shipping Iron Ore from Finland.—The discovery of rich and extensive deposits of iron ore at Kuolajarvi (N.E. Finland) is, says *Hansa*, of the greatest importance to the future development of Baltic shipping. The ore will have to be exported, since Finland has no known coal deposits. Germany naturally offers a favourable market, especially since the development of iron works in Sweden will prevent Swedish ore exports from increasing by any considerable amount, and may cause them to decrease. Transport would probably be from Tornea, Kemi and Uleaborg to Danzig and Stettin.

Atlantic Shipping Conference.—According to *The Times* Liverpool correspondent, negotiations have been concluded between British and French steamship lines interested in the North Atlantic trade with the object of forming a conference to deal with the passenger business of the lines and cognate matters. This conference will be known as the Atlantic Conference, and takes the place of the conference as it existed before the war, in which the German lines participated. A secretary has been appointed, whose office for the present will be in Paris. The new organisation will work in harmony with the conferences of a similar nature already existing in Liverpool, Italy, and the United States, which deal with matters affecting the respective sections of the North Atlantic trade.

Canadian Ships for Canada.—According to *The Times* correspondent at Ottawa, Colonel Ballantyne, Minister of Marine and Fisheries, has announced that the Government has decided to utilize the full capacity of the existing shipyards in Canada to produce modern shell cargo steamers of the most approved type for the use of the Government and registry in Canada. The capacity of the yards is estimated at 300,000 tons. During the continuance of the war the construction of shell ships in Canadian yards for foreign registry will not be permitted. Colonel Ballantyne states that one of the chief difficulties in the way of successfully carrying on the construction programme lies in the difficulty of securing shell plates, and states that negotiations are in progress to establish a rolling mill for steel ship plates in Canada.

SHIPPING SHARE MARKET.

The stock and share markets have opened the New Year in strength and the shipping section has been one of the most active in the market. Prices show considerable changes on the balance of the week, but in many instances the altered quotations are the result of the deduction of the dividends and interest on preference and debenture stocks. The air has again been full of rumours respecting forthcoming amalgamations, and it is difficult to sift the chaff from the wheat. The report of the Sutherland purchase has not directly affected any stocks dealt in on the London market. The further rise in Indo-China Steam Navigation deferred ordinary to 35½ (which now compares with only 14½ early last year) on the strength of rumours that the Peninsular & Oriental were taking the company over, has brought an official denial by cable from the general managers in Hong Kong. It is probable, however, that owing to the keen demand for tonnage for future years, reports will be current of various amalgamations for some time to come. Royal Mail stock and Peninsular & Oriental stock are unchanged at last week's prices, and investment interest still appears to centre more in the lower-priced descriptions which are being purchased very largely on account of provincial interests. The buying of Prince Line shares continues, but the price is still about 6½, which gossip credits as the maximum figure to which the buying syndicate will go in its purchases of the shares. Moor Lines retain the advanced price of 35, although there is no further news to justify the big recent advance. Cairn Line shares are 1s. lower despite the declaration of the interim dividend and bonus at the same rate as a year ago, namely, 1s. per share. Court Lines have been in demand, and have now touched £2 per share. Among recent dealings have been transactions in Irrawaddy Flotilla shares at as high as 120 per £40 share. Shipbuilding shares receive attention, but the advance in quotations has been checked, and some shares exhibit a fractional reduction in price.

SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

SHIPPING.

Name.	Share and paid.	Extreme quotations, 1917.	Last annu. div. % or per share.	Yield. %	Last Quotation	Rise or Fall.
	£					
African S.S.	20	30½—25½	10	7½	28	
Allan Line ... ... Deb.	100	—	4	4½	92	
Anchor Line ... Cum. pref.	10	9½—8½	5½	5½	9½	
Do. ... ... Deb.	Stk.	105½—10½	4½	4½	103	
Argentine Nav. ... Cum. pref.	1	25/—14/3	Nil.	Nil.	23/3	
Do. ... ... Ord.	1	20/6—6/6	Nil.	Nil.	16/9	— -/9
Australasian Un. S. Nav. Deb.	Stk.	80½—79½	4	5	81xd	
Belfast Steam ... ... "A."	10 (5pd.)	—	5	5	5	
British & Argen. Nav. ... Deb.	Stk.	84— 80	4½	5½	81	
British India Nav. ... Deb.	Stk.	84 82	4½	5½	81	
British S.S. Invest. Trust Def.	Stk.	400—344½	50*	11½	440xd	
Do. ... ... Pref.	Stk.	105½—104	6	5¾	102xd	
Do. ... ... Deb.	Stk.	74½—70	4½	6⅓	73xd	
Cairn Line ... ... Deb.	Bds.	94—90	5	5½	90½—91	
Do. ... ... "A."	1	51/6—40/9	20†	8	48/3	—1/-
Clan Line ... ... Ord.	10	55½—26½	25	5½	44	+ 1½
Court Line ... ... Ord.	£1	40/6—29/6	20	10	40/—	+ 2/3
Cunard SS. ... ... Ord.	1	85/—63/9	20*	5	80/—	+ -/6
Do. ... Cum. pref.	Stk.	97½—82	5	5½	85xd	
Do. ... ... Deb.	Stk.	100—93¾	4½	4½	98xd	
Elder Line ... ... Deb.	Stk.	95—89	4½	4½	103	
Elder Dempster ... Cum. pref.	1	19/—17/-	6½	6½	17/9xd	
Do. ... ... Deb.	Stk.	89—85	5	5½	85xd	
Ellerman Lines ... Pref. Ord.	10	9½—8½	6½	6½	9½xd	+ ½
Do. ... Guar. pref.	10	9—8½	4½	5½	8½	
France Fenwick ... Cum. pref.	5	95/3—85/-	5½	6½	87/6	
Furness, Withy ... Ord.	1	60/9—41/6	20*	6½	60/—	+ 2/—
Do. ... Cum. pref.	10	9—7¾	5	5½	8¾	
General Steam Navy. ... Ord.	1	24/9—21/6	10	7½	23/6	— 1/3
Do. ... ... Pref.	1	19/1½—15/-	5	6½	16/—	
Houlder Line ... Cum. pref.	5	82/6—75/-	5½	6½	77/6xd	— 2/6
Do. ... ... Deb.	Stk.	—	4½	4½	91xd	
Houlder Bros. ... Cum. pref.	5	—	5½	6¾	4	
Do. ... ... Deb.	Stk.	—	4½	5¼	82	
India Gen. Nav. & Rly. ... Ord.	10	11¾—8½	6	5⅜	11	
Indo-China N. ... Pref. Ord.	5	97/6 87/6	6	6¾	97/6	+ 2/6
Irrawaddy Flotilla	40	—	15	5	120	
Khedivial Mail ... ... Ord.	1	40/—24/-	20	12½	33/6	—1/-
Do. ... ... Pref.	5	76/3—70/-	5½	7⅓	73/9	— 1/3
Do. ... ... Deb.	Stk.	95¾—93	4½	4¾	95xd	
King Line ... ... Ord.	1	42/6—31/6	16*	9¼	41/-	
Lamport & Holt ... Cum. pref.	£1	20/3—18/-	6	6⅔	18/6xd	
Leyland (F.) ... Cum. pref.	10	8½—7¼	5	7⅓	8¾	
Mercantile SS. ... ... Ord.	5	30½—15	40	8	29¼	
Do. ... ... Pref.	1	21/—15/9	5	6¾	20/3	
Moor Line ... ... Ord.	10	35—20	30	13½	35	+ 12½
Nelson Steam Nav. ... Deb.	100	—	5	5⅛	98¾	
New Zealand ... ... Ord.	£10	—	8	2½	32½	
Do. ... ... Deb.	Stk.	87½—86½	4	4⅝	88⅜	
Nitrate Producers SS. ... Ord.	5	25⅝ 20	30	6½	24½	
Do. ... Cum. pref.	5	100/—90/-	5	5	5	
Oceanic Steam. Nav. ... Deb.	100	98½—84	4½	4⅔	94xd	
Orient.Stm.Nav.Co. Cum. pref.	10	9⅞—8½	5	5⅔	8¾	
Do. ... ... Deb.	100	92—88	4½	5⅛	88	
P. & O. S. N. ... Cum. pref.	100	93¾—84	5	5⅜	91	
Do. ... ... Def.	100	342—295	18	5⅓	339	
Do. ... ... Deb.	Stk.	65½—63¾	3½	5½	63	
Prince Line	1	6⅝—3.7	30*	5⅛	115/-	
R.M.S.P. ... ... Ord.	100	125—102½	7	6	121½	
Do. ... ... Pref.	Stk.	85½—80	5	6	85	
Do. ... ... Deb.	Stk.	86—79	4½	5⅔	78xd	
Shaw, Savill & Alb. Cum. pref.	5	87/6—80 —	5½	6¼	85/—	
Shell Transport ... ... Ord.	1	40/—26/3	35	6⅔	5⅝	
Do. ... Cum. pref.	10	9½—9⅛	5	5⅝	9⅛	
Sutherland SS. Co.	£1	75/— —50/9	30	8	72/6	—2/6
Union-Castle SS. Cum. pref.	10	7¾ —7⅛	4½	6	7¼xd	
Do. ... ... Deb.	Stk.	90—86	4	4⅔	86xd	
West Hartlepool ... ... Pref.	10	7¾—7⅞	5½	6⅝	7¾xd	

INSURANCE.

Alliance	20 (2'4 pd.)	10½—9	12/-	7	9½	
London Assurance ...	25 (12½ pd.)	60½—48¾	20	6	60	
Merchants' Marine Insurance ...	10 (2½ pd.)	10½—6¾	10	6	9¾	
N. British & Mercantile ...	25 (6¼ pd.)	36—29	40/	6⅔	34½	
Phœnix Assurance	10 (1 pd.)	7⅞—6	40	7	7⅞	
Royal Exchange Assurance ..	Stk.	241½—187	10	4½	244	+4
Sea Insurance	10 (2 pd.)	27½ 24⅛	10	6	27	
World Marine, Limited ...	5 (2 pd.)	6⅝—55/-	5	4⅝	6	+ 1/16

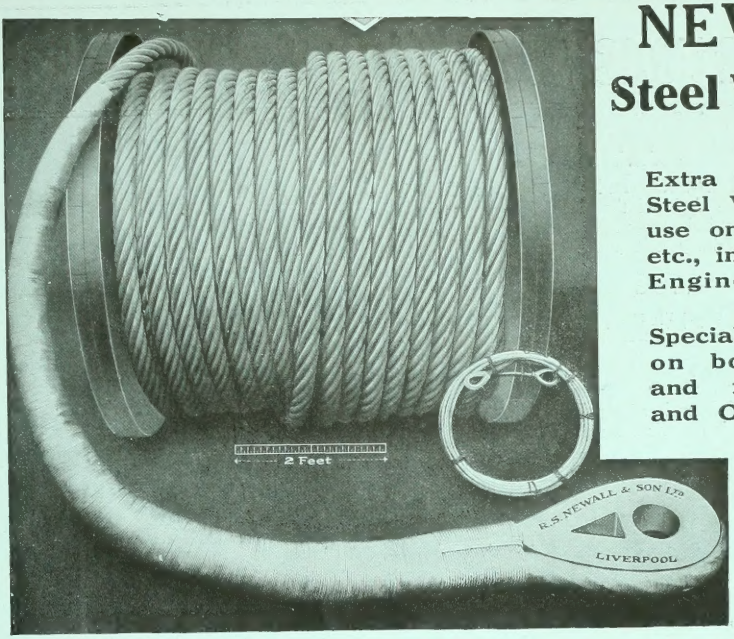
IRON AND STEEL.

Name.	Share and paid.	Extreme quotations, 1917.	Last annu. div. % or per share.	Yield. %	Last Quotation	Rise or Fall.
	£					
Babcock & Wilcox... ... Ord.	1	68/— 52/6	15	4½	64/6	+ -/9
Baldwins ... ... Cum. pref.	1	20/—15/-	5½	5⅜	20/-	
Do. ... ... Deb.	Stk.	84—82	4½	5⅜	84xd	
Bayliss, Jones ... Cum. pref.	1	—	5	7¼	1¼	
Bell Bros. ... ... Cum. pref.	10	10—9½	6	6	10	
Do. ... ... Deb.	Stk.	80—73¾	5	6⅞	75¾xd	
Bessemer (Henry) ... Ord.	1	34/6—24/6	12½	7⅛	33/6	—1/-
Bolckow Vaughan ... Ord.	1	30/— 22/2	11	7⅓	28/-	
Do. ... ... Cum. pref.	20	17½—16¾	5	5⅜	17	
Cargo Fleet Iron ... ... Ord.	1	24/9—17/3	3	2⅜	22/-xd	
Do. ... ... Deb.	100	84—81½	4½	5⅜	82xd	
Consett Iron Co. ... ... Ord.	1	36/3-24/10½	50	11	90/-	
Dominion Iron & Steel	Bds.	88⅜—71⅜	5	7	71	
Dorman, Long ... ... Ord.	1	50/— 30/9	8†	—	46/-xd	
Do. ... ... Deb.	Stk.	—	4	5½	71xd	
Ebbw Vale Steel & Iron ... Ord.	1	30/6—24/6	12½	9	28/—	+ -/6
Guest, Keen & Nttefids ... Ord.	1	89/—62/6	15*	3⅜	82/6	
Do. ... ... Cum. pref.	5	5⅛—5	5	4⅜	5⅛	— ⅛
Do. ... ... Deb.	Stk.	79½—73¾	4	5½	78xd	
Hadfield's Steel Foundry Ord.	1	107/6—78/6	30	5½	105/-	
Ibbotson Bros.	5 (4 pd.)	7—6½	7½	4½	6½	
Jessop (W.) & Sons ... Ord.	5 (4 pd.)	10—8	15*	6	10½	+ ½
Lanarkshire Steel ... Cum. pref.	10	—	5	7⅛	7	
Lysaght (J.) ... ... Cum. pref.	1	25/—20/-	6	6	20/-	
Do. ... ... 2nd pref.	1	19/9—19/4½	6	6	20/-	
Manganese Bronze ... Ord.	1	—	6	11	1⅛	
Do. ... ... Cum. pref.	1	—	6	8	⅝	
North-Eastern Steel ... Deb.	Stk.	—	4½	—	—	
Parkgate Ship & Iron "A" ...	1	13/—9/9	Nil.	Nil.	12/9	— -/7½
Scott (Walter) ... ... Ord.	1	29/4½—21/3	15	10⅜	29/-	
Do. ... ... Pref.	1	19/9—16/-	6	7⅛	19/-	
Sheffield Forge ... ... Ord.	1	—	15	4⅜	66/-	
Shelton Iron & Steel ... Ord.	1	24/6-16/10½	7½	6	23/-	
Do. ... ... Deb.	100	91½—91	5	5½	91½xd	
S. Durham Steel & Iron ... Ord.	1	42/9—29/-	15	4⅛	38/-	
Do. ... ... Cum. pref.	1	20/9—18/7½	6	6	20/-xd	
Do. ... ... Deb.	Stk.	81—80	4½	5⅝	78xd	
Steel Co. of Scotland ... Ord.	10	—	10	10	12/1/-	
Stewarts & Lloyds Pref. ord.	10	17—16	10	6¼	16	
Do. ... ... Cum. pref.	10	—	6	4⅜	13½	
Stone (J.) ... ... Cum. pref.	10	8¾—7⅛	5	6⅜	7½xd	
United States Steel ... ... Ord.	100$	124—109⅜	8	7⅓	110¼	
Do. ... ... Cum. pref.	100$	—	7	6⅓	114½	
Vickers Ltd. ... ... Ord.	1	44/6 - 35/3	12½	5⅔	42/7½	
Do. ... ... Pref.	Stk.	84—81	5	6	82	
Do. ... ... Deb.	Stk.	79 - 74½	4	5⅛	77⅛	
Weardale Steel ... Def. ord.	1	32/3 23/-	19½	13⅔	27/-	+ -/6
Do. ... ... Cum. pref.	1	25/3—18/9	6	8½	23/-	
Do. ... ... Deb.	Stk.	—	4	6⅔	62	
Workington Iron & Steel Ord.	1	30/3—21/-	10	6⅔	29/3	

SHIPBUILDING AND MARINE ENGINEERING.

Armstrong, Whitworth ... Ord.	1	45/—36/-	12½	5⅔	41/6	
Do. ... ... Cum. pref.	5	7⅜/9—67/-	4	5⅞	67/6	
Do. ... ... Deb.	Stk.	78—73	5	6⅞	76xd	
Beardmore (W.) ... ... Deb.	100	93—89	4½	5	90xd	
Brown (John) ... ... Ord.	1 (15s. pd.)	2:—/ 22/9	12½	7⅛	27/-	
Do. ... ... Cum. pref.	10	8¾—7⅛	5	5⅞	8⅜	
Cammell Laird ... ... Ord.	5	7⅞—6¾	10	7⅛	8⅜	+ 2/6
Do. ... ... Cum. pref.	5	85/6—74/6	5	6⅔	82/6	
Do. ... ... Deb.	100	83⅛—79⅛	4½	5⅓	80	
Dunlop (Jas.) ... ... Ord.	1	28/9—16/-	10	9⅛	22/-	
Do. ... ... Cum. pref.	1	18/9—16/6	6	7⅛	17/6xd	
Fairfield Shipbldg ... Cum. pref.	10	8⅞—8¼	6	7⅛	8⅜	
Fleming & Ferguson ... Ord.	10	17	10	7	14¼	
Gray (Wm.) ... ... Deb.	100	100—95⅛	4½	4½	100½xd	
Hawthorn (R. & W.) Leslie Ord.	10	25⅛—15¾	12½	5	25⅛	
Henderson (D. & W.) Cum. pref.	1	—	5	9	5⅝	
Richardson, Westgarth ... Ord.	1	10/3—5/-	Nil.	Nil.	8/-	
Do. ... ... Cum. pref	1	19/9—12/6	Nil.	Nil.	17/-	+ -/9
Do. ... ... Deb.	Stk.	67—62	4½	6⅞	66xd	
Simons (W.) ... ... Cum. pref.	10	—	5	5	9½	
Swan, Hunter & W. R. ... Ord.	1	51/—33/6	12½	5⅓	50/-	
Do. ... ... Cum. pref.	1	17/3—17/-	5	5⅔	17/-	
Do. ... ... Deb.	Stk.	78—77	4½	5⅔	77xd	
Thornycroft (John I.) ... Ord.	1	45/—16/-	17½	8⅓	40/-	+ -/6
Do. ... ... Cum. pref	1	19/—16/-	6	6⅔	19/-	+ -/3
Do. ... ... Deb.	100	—	5	5⅛	85xd	
Wallsend Slipway ... ... Ord.	1	2—1⅛	10	5	2	
Do. ... ... Cum. pref.	1	1—1	5	5	1	

* Including bonus. † Also 20 % in shares. ‡ Treasury price.



Best Quality Galvanized Plough Steel Wire Rope, 10½ in. Circ.

NEWALL'S
Steel Wire Ropes

Extra Special Flexible Steel Wire Ropes for use on Giant Cranes, etc., in Shipyards and Engineering Works.

Special Ropes for use on board Warships and for Aeroplanes and Ordnance. :: ::

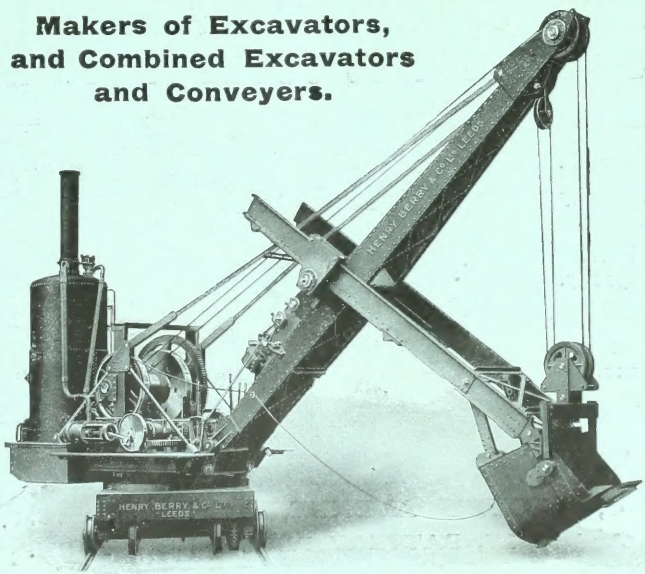
R.S. NEWALL & SON, LTD.

LIVERPOOL
GLASGOW
LONDON

HENRY BERRY & Co., LTD., LEEDS.

Hydraulic Machinery for
RIVETTING
PUNCHING
PRESSING
BENDING
FLANGING
JOGGLING
FORGING
STAMPING
LIFTING
SHEARING.

Makers of Excavators, and Combined Excavators and Conveyers.



STEAM CRANE EXCAVATOR.

BELT, STEAM, AND ELECTRIC-DRIVEN PUMPS.

FIXED AND PORTABLE RIVETTING MACHINES.

ACCUMULATORS.

PUNCHING AND SHEARING MACHINES.

FORGING AND FLANGING PRESSES.

CRANES, LIFTS, VALVES, PIPING, ETC., ETC.

For Emergency Lighting & Wireless.

SELF-STARTING.

The S.O.S. "LISTER-BRUSTON" Automatic Electric Generating Plant is so designed that immediately the voltage of the ship's main electrical supply falls below a predetermined point, the plant automatically starts up.

SELF-TESTING.

This plant automatically starts up and stops at any predetermined time daily, to indicate that it is in working order.

SELF-STOPPING.

Upon the resumption of the main supply the S.O.S. "LISTER-BRUSTON" Automatic Electric Generating Plant automatically stops.

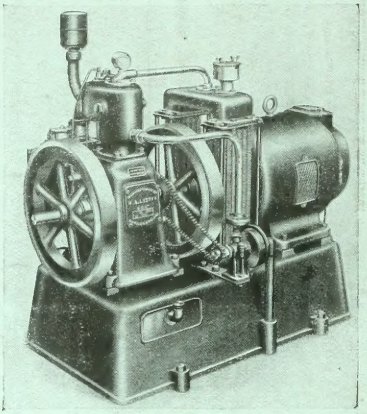
For prices and further particulars apply to—

R. A. LISTER & CO., Ltd.

(Dept. B 24),

47, VICTORIA ST., WESTMINSTER, S.W. 1. DURSLEY, : GLOS. :

Established 1867.



The "Lister-Bruston" (Patent) Automatic Electric Generating Plant, S.O.S. Type.

"ISHERWOOD SYSTEM OF SHIP CONSTRUCTION"

Suitable for ALL TYPES of Vessels.

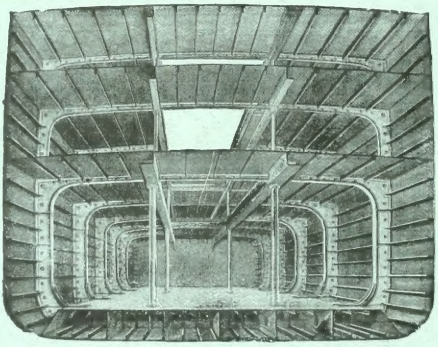
Increased Strength.

Increased Capacity for Bale Goods.

Increased D.W. Carrying Capacity.

Improved Ventilation.

Reduced Cost of Maintenance.



Reduced Vibration.

800 Vessels Built or being Built, representing about 6,000,000 gross reg. tons.

310 Bulk Oil Carriers, representing about 2,800,000 gross reg. tons.

J. W. ISHERWOOD,

4, LLOYD'S AVENUE, LONDON, E.C. 3.

And at 17, BATTERY PLACE, NEW YORK.

Agents for Great Britain: S. C. CHAMBERS & CO., 3, King Street, LIVERPOOL.

London: Printed by HARRISON & SONS, Printers in Ordinary to His Majesty, 45, 46, and 47, St. Martin's Lane, London, W.C. 2, and published by TRANSPORT (1910) LIMITED, Proprietors of SHIPBUILDING AND SHIPPING RECORD, at Queen Anne's Chambers, Westminster, London, S.W. 1. *January* 10, 1918.